ORDER NO. VRD-8303-372

Service Manual

Color Video Camera
PK-957
Power Supply Unit
PK-A789S

PK-957

Panasonic
Power Supply
Camera In
Power
On
Off

PK-A789S

Vol. 1	**Vol. 2**	**Vol. 3**	**Vol. 4**	**Vol. 5**
Summary Technical Descriptions	*Adjustment Procedures*	*Block Diagrams*	*Schematic Diagrams*	*Exploded Views Replacement Parts List*

Panasonic®

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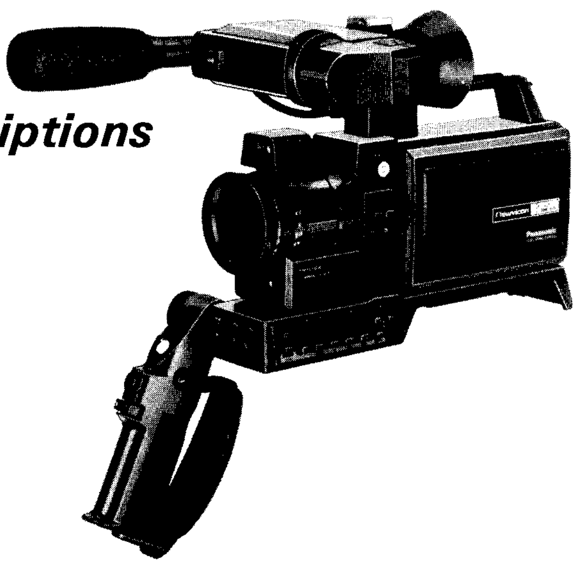
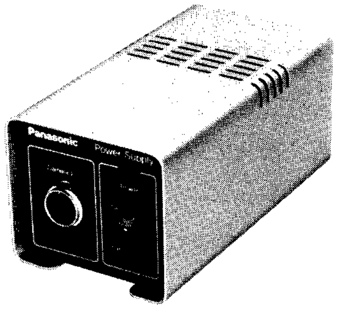
PK-A789S

Vol. 1

Summary
Technical Descriptions



PK-957



PK-A789S

SPECIFICATIONS:

Power Source: DC 12V ± 10%
AC 120V ± 10%, 60Hz ± 0.5%
(with Power Supply Unit)
Power Consumption: DC 6.6W at 12V DC (Battery)
(with E.V.F) DC 2.0W at standby
Newvicon Tube System: 2/3″ frequency separation single tube system (built-in stripe filter)
Single Carrier Frequency: 5MHz
Focus System: Electro-static type
Lens Mounting: Built-in zoom lens (not "C" mount)
Lens: 8:1 zoom lens with auto/manual iris control.
Auto zoom lens and macro construction
F: 1.6, f: 12—96mm
d: 1.2m to infinity
Lens Diameter: 58mm
Light Sensitivity: Minimum light intensity on optical image: 10 Lux (F: 1.4)
Optimum light intensity on optical image: 900 Lux
Video Output Level: 1.0Vp-p, 75Ω (M type coaxial connector)
(Standard NTSC signal)
Sync. System: Internal Sync.: RS-170
Signal to Noise Ratio: More than 45dB
Horizontal Resolution: 300 lines
Color Temperature Control: 2 step switch (indoor/outdoor) & auto adjust
Microphone: Built-in stereo microphone
Audio Output Level: −20dB, Hi-impedance
Audio Output Impedance: High impedance (1KΩ)
External Microphone Input Impedance: 600Ω unbalanced
(Left, Right)
Electronic Viewfinder: Monochrome 1 inch CRT
Operating Temperature: 5°C to 40°C
Operating Humidity: 10% to 75%
Operating Position: Normal position only
Weight: Camera Head with E.V.F.
5.5 lbs (with lens, 7ft cable & shoulder pad/handle grip)
AC adaptor (option)
2.4 lbs
Dimensions: Camera Head with E.V.F.
8.3″(W) × 8.7″(H) × 11.8″(D)
208mm(W) × 218mm(H) × 296mm(D)
AC adaptor (option)
3″(W) × 3″(H) × 6″(D)
79mm(W) × 75mm(H) × 149mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

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FEATURES

Newvicon tube
This pick-up tube features high resistance to burns and excellent low light sensitivity.

Electronic viewfinder
The electronic viewfinder allows you to see a TV image of what the camera lens sees.

Camera Remote Control
VCR functions (PLAY/PAUSE, CUE, REVIEW, SLOW/F.ADV, INSERT) can be controlled from the camera which incorporates the microcomputer system.

Electronic Viewfinder Display
Title, date, lapse time, battery, and tape counter can be displayed on the viewfinder (for compatible VCR's).

Auto focus system
Focusing is automatically set by pushing the Auto Focus switch.

Zoom lens with Power zoom and MACRO function
8:1 zoom lens with Power zoom allows you to "zoom-in" for a closer picture. This is simply done by pressing the Power zoom switch. Also, close-up pictures can be obtained by using MACRO function.

Automatic iris control
Automatic iris control adjusts the amount of light entering the camera to provide the proper picture contrast.

Automatic white balance control
Optimum color pictures can be achieved under varying lighting conditions.

Stereo microphone
Stereo sound as well as pictures can be recorded at the same time because the camera contains a built-in stereo microphone.

Standby switch
The standby switch is for saving battery power when the recording is in the pause mode for a long period.

Negative-positive reverse switch
Negative color films can be converted to in normal color video by using the optional Adaptor.

Fader switch
The picture and audio automatically fade in or fade out every time you push the VCR remote control switch.

ACCESSORIES

Accessories included:

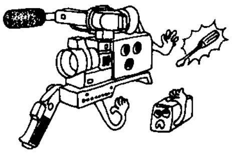
Standard accessories (supplied)
Camera Unit (PK-957) ..1pc.
Electronic Viewfinder (PK-M055) ..1pc.

Optional accessories

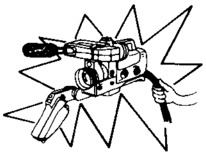
10-pin extension camera cable (20H-20F)
AC Adaptor (PK-A789S) with 4 cables
Film transfer Adaptor (PK-F35B)
Camera Carrying Case (PK-H60)

PRECAUTIONS

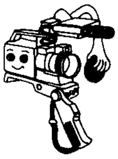
x Do not attempt to disassemble the camera or power supply. In order to prevent electric shock, do not remove screws or covers.
There are no user-serviceable parts inside.



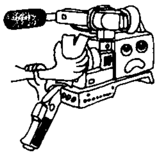
x Do not abuse the camera. Avoid striking, shaking etc. The camera contains a sensitive pick-up tube which could be damaged by improper handling or storage.



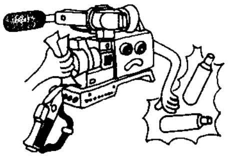
x Do not let the lens remain uncapped when the camera is not in use.



x Do not touch the surface of the lens with your hand.

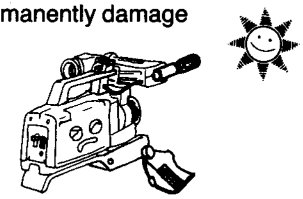


x Do not use strong or abrasive detergents when cleaning the camera body.



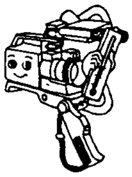
x Do not leave the camera in a position that exposes the viewfinder eyepiece to direct sunlight. The sunlight concentrated by the eyepiece lens can cause damage to the eyepiece.

x Do not aim the camera toward the sun or other extremely bright objects, whether it is turned on or not. This action could permanently damage the pick-up tube.

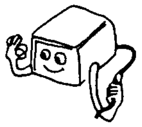


x Do not expose the camera or power supply to rain or moisture, or try to operate it in wet areas. Do not operate the camera or power supply if it becomes wet.

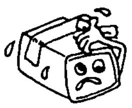
x Do not use the camera in an extreme environment where high temperature or high humidity exist.



x Do not try to operate the camera and power supply on power line voltages other than 120V AC at 60Hz.



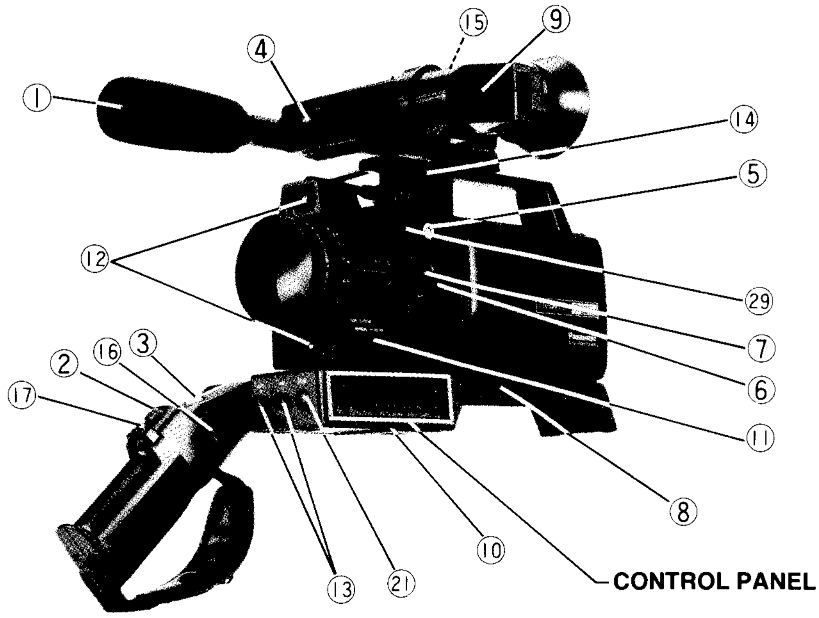
x Do not leave the camera and power supply turned on when not in use.
Do not turn the power on and off repeatedly without use.
Do not block the ventilation slots.



x Do not store the camera under conditions where temperatures are over 149°F (65°C).

OPERATING COMPONENTS AND THEIR FUNCTIONS

A. Camera Head



① **Stereo Microphone**
To record stereo sound while the picture is being recorded.

② **VCR Pause Button (pause/record trigger)**
The trigger operated switch is used to place the VCR in the pause mode while focusing or adjusting the camera or simply changing the scene to be recorded. Press the switch once to activate pause, press again to resume recording.

③ **RECORD/REVIEW Switch**
When the camera is used with a VCR having Record/Review capability, it is possible to monitor the last few seconds of recorded material on the viewfinder screen or monitor screen by pressing the button while the VCR is in the Record/Pause mode. When playback is finished, the recorder will return to the Record/Pause mode automatically, and the next segment recorded will be in synchronization with the last segment recorded.
Note: This feature on the 900 series cameras is compatible only with the PV-6000 series VCR's.

④ **Tally Light (VCR remote control status LED)**
The tally light (red) flashes while recording so that person in front of the camera will know that recording is actually in progress.

⑤ **Auto/Manual Iris Control Switch**
This switch selects the lens iris control for MANUAL or AUTO operation.
(1) When this switch is pushed in, the auto-iris automatically adjusts the lens opening or aperture to admit the proper amount of light for the camera.
(2) When this switch is pulled out, the lens iris can be manually adjusted.

⑥ **Color Temperature Correction Switch (Filter selection)**
This switch selects the approximate corrections for indoor or outdoor usage.
Set to "☼" for outdoor use and set to "💡" for indoor use.

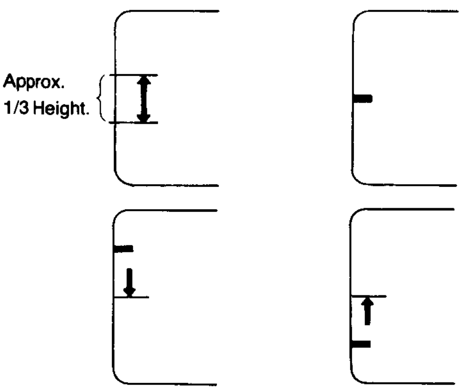
⑦ **Automatic White Balance (A.W.B.) Switch**
The camera has an Automatic White Balance circuit. White balance is automatically set by pushing the A.W.B. switch, after making the proper selection with the color temperature correction switch. The A.W.B. indicator on the Electronic Viewfinder glows green when the white balance is set.

⑧ **VHS Compatibility Switch**
This switch is preset to the ⊕RUN position for operation with PANASONIC and compatible VCR's. If the REC indicator (item ⑨ c) gives a reversed indication for actual pause and run modes, place the camera in the standby position and place the compatibility switch in the "RUN ⊖" position. Slide the shoulder pad backward to gain access to this switch.

RUN⊖ ▭▨ ⊕RUN

⑨ **Electronic Viewfinder (EVF)**
This is a TV monitor which shows the actual picture that the lens sees in black and white.
The Electronic Viewfinder is attaches to either side of the camera head for right or left hand operation.

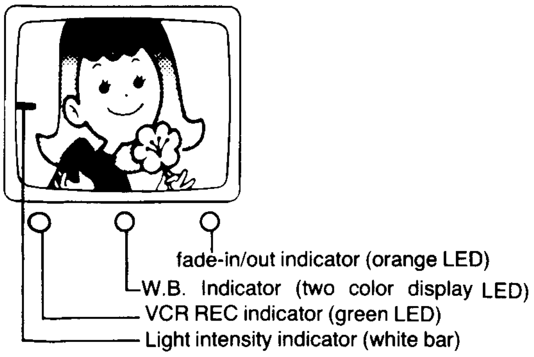
a) Light intensity Indicator
The Light intensity indicator is a white bar located on the left side of the viewfinder. Adjustment of the lens iris (manual or auto) affects the position of the indicator as shown in the following diagrams.



- Usable iris setting range.
- Proper iris setting position.
- Illumination too high. Close the lens iris.
- Illumination too low. In manual mode open the lens iris. In auto mode additional illumination is required.

b) W.B. Indicator
This indicator is a two-color LED which is used with the Automatic White Balance Control (item ⑦). The LED glows RED when the camera is turned on. This means that the white balance hasn't been set yet. Before you are ready to shoot – press the A.W.B. button. While the white balance is automatically being adjusted – the LED flashes RED – GREEN – RED – GREEN, etc. The LED will glow GREEN when the white balance is set. Set A.W.B. again if the lighting is changed.
※When the standby switch ⑳ is set to "STANDBY", this indicator glows RED. Also when the VCR is in the PLAY/PAUSE mode, this indicator glows RED.

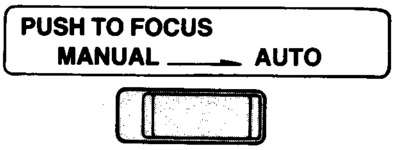
c) VCR REC indicator
This green indicator is on when the recording is in progress.


fade-in/out indicator (orange LED)
W.B. Indicator (two color display LED)
VCR REC indicator (green LED)
Light intensity indicator (white bar)

d) Fade-in/out indicator
This orange indicator is on when the Fader switch in ON. Also it flashes during fade-in/out.

⑩ **Tripod Mounting Hole**
This hole is used for mounting the camera on a tripod with standard 1/4-20 thread.

⑪ **Auto Focus Button**
This button is pressed in and released for automatic focusing of each shot.
To lock in auto focus mode, push the button and slide it to the AUTO position.
Manual Focus-in/Focus-out operation is not possible when the Auto Focus system is working.
When Auto Focus is not used, camera can be focused manually by rotating lens barrel.



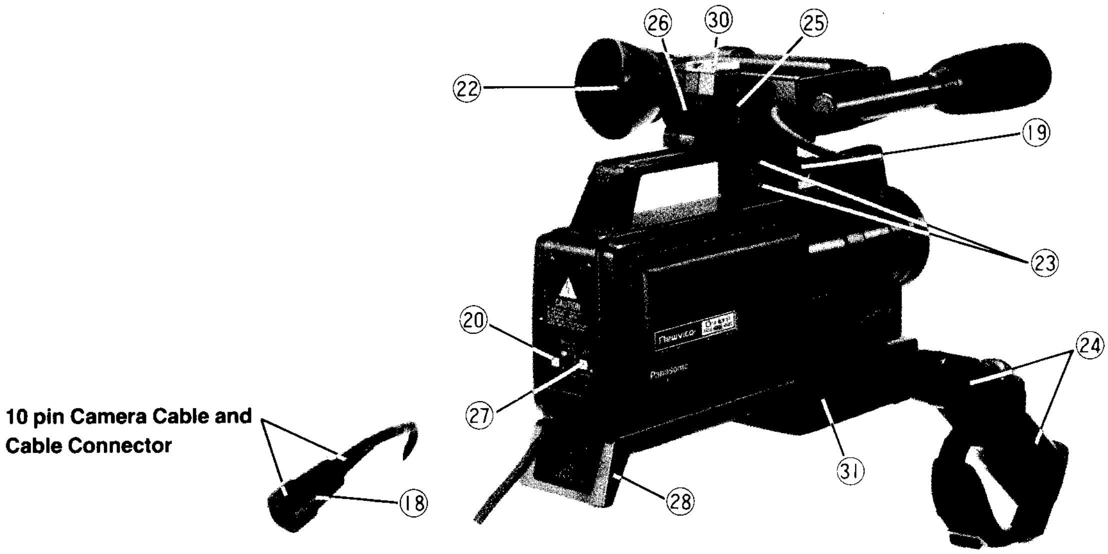
⑫ **Distance Detection Windows**
These two windows are for detecting an object to lens distance. Do not cover these windows.

⑬ **Color Controls**
The red and blue color are balanced and preset at the center (detent) position which usually will provide accurate color reproduction. When used indoors, the color balance control can be adjusted while viewing a color TV.

⑭ **Stereo-Monaural selection switch**
Set to the "STEREO" position for stereo sound recording. For monaural sound recording, set to the "MONAURAL" position.

⑮ **Picture turning switch**
This switch is used to invert the picture on the EVF and should be switched only with power off.

(1) Set to the "R" position for right hand operation.
(2) When the EVF is mounted for left hand operation, the viewfinder picture is upside down. Accordingly, set to the "L" position so that the picture on the EVF can be seen in upright position. This switch does not affect the picture which is being recorded.



⑯ **Power Zoom Speed Control**
This camera has a power zoom lens with variable speed. Adjust the speed to your preference.

⑰ **Power Zoom Switch**
This switch works in conjunction with the zoom lens, and allows you to "Zoom-in" (Telephoto or T position) or "Zoom-out" (Wide Angle or W position) by pressing it toward the T or W position.

⑱ **Camera Cable**
This 7 foot long cable is used to provide the interconnections between the camera and portable VCR.

⑲ **Electronic Viewfinder Connector**
This is a receptacle for the connection of the electronic viewfinder.

⑳ **Standby Switch**
This switch is used for longer battery operation. Set this switch to "Standby" when leaving the camera in the pause mode for a long period.
The picture disappears on the Electronic viewfinder when setting this switch to "Standby". When the standby switch is set to "Operate", the camera and portable VCR operate normally.
Also, there are two positions for "OPERATE". Set to "STANDARD" for normal operation. When the illumination is insufficient, set to "GAIN-UP" to make the picture brighter.

㉑ **Fader Switch**
This fade-in/out functions in conjunction with the VCR pause / record button (item ②) on the camera. When the Fader switch is ON, the picture and audio automatically fade in or fade out every time you push the VCR remote control switch. Fade-in/out time is approx. 3 seconds.

㉒ **Viewfinder Picture Tube**
The 1" picture tube will show the actual scene the camera "sees" in black and white.

㉓ **External Microphone Inputs**
Accommodate external microphones to permit closer audio pick-up. The stereo channel (left, right or both) of the built-in microphone is automatically disconnected when the external microphone is plugged in according to the corresponding input connector. Use microphone with 600 ohm impedance (See Audio recording function's page).

㉔ **Adjustable Handle Grip & Knob**
This grip is used for holding the camera and is adjustable for easy holding and operation. To adjust position, loosen knob and turn grip. The grip should be firmly tightened by turning the knob.

㉕ **EVF Mounting Roller**
This roller tightens the EVF to hold if firmly to the camera head.

㉖ **EVF Lock Lever**
This lever locks the EVF to the camera. Release the lock to allow the EVF to slide into the desired position.

㉗ **Negative — positive reverse switch**
This switch reverses the video signal. In normal shooting, set to the "NORMAL" position. When shooting negative films, the switch is set to the REVERSE position so that normal colors can be produced.
(Use the optional Adaptor for film installation.)

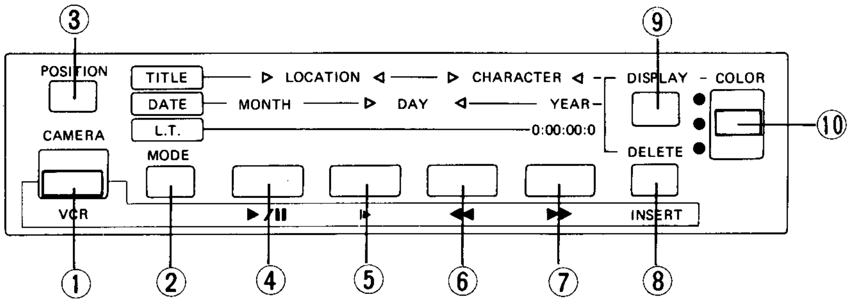
㉘ **Shoulder pad**
This shoulder pad is useful when recording without a tripod and is adjustable for comfortable position.

㉙ **Macro Setting Button and Macro Position**
For close up pictures down to a distance of approx. 1 in. Press this button and push the zoom lever to set the zoom ring to the Macro position range.
Notes: 1) Make sure the illumination on the subject is sufficient for close up shooting.
2) Use the zoom lever to focus when in the Macro range.

㉚ **Accessory Shoe**
The Accessory Shoe can be used for mounting of accessories.

㉛ **Auxiliary Connector**
This connector is used for future purpose.

B. CONTROL PANEL


③
⑨
POSITION
CAMERA
VCR
TITLE
DATE
L.T.
MODE
▷ LOCATION ◁
▷ CHARACTER ◁
MONTH
▷ DAY ◁
YEAR
0:00:00:0
DISPLAY - COLOR
DELETE
▶/II
I▶
◀◀
▶▶
INSERT
⑩
①
②
④
⑤
⑥
⑦
⑧

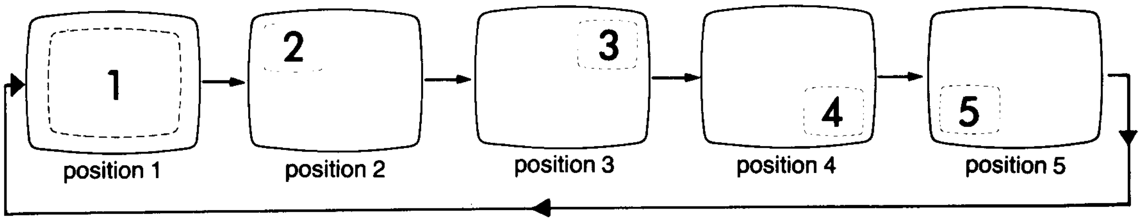
① **VCR/CAMERA selector switch**
This switch determines if the recorder will either be recording or playing.
When the switch is in the "CAMERA" position, the Portable VCR is in the RECORD/PAUSE mode. When the switch is in the "VCR" position the VCR is in the PLAY/PAUSE mode.

② **Display Mode selector switch**
This switch determines the type of display on the monitor.
The display changes as follows for each time the switch is pressed while in the RECORD/PAUSE mode.

Title → Title & Date → Title & Lapse time → Date → Lapse time

Title	character (alphabet, number, sign)
Date	month, day, year
Lapse time (L.T.)	Stopwatch (second, minute, hour)
Title & Date	Title and Date can be displayed. (Title will not be changed.)
Title & Lapse time	Title and Lapse time can be displayed. (Title will not be changed.)

③ **POSITION selector switch**
This switch changes the position of the displayed area on the monitor.
Each time the switch is pressed, the position changes in the following sequence.


1
2
3
4
5
position 1
position 2
position 3
position 4
position 5

④ ⑤ ⑥ ⑦ ⑧ buttons

The functions of these buttons depend upon the operating mode. The chart below shows that there are three display modes selected by the Display Mode selector and a Camera Remote Control mode selected when the VCR/CAMERA switch is in the VCR position.

Button Mode	④	⑤	⑥	⑦	⑧
Title	Location Forward	Location Reverse	Character Forward	Character Reverse	Title Delete
Date Title & Date	Month Forward	Day Forward	Day Reverse	Year Forward	——
L.T. Title & L.T.	——	——	——	Reset	——
Camera Remote Control	Play/Pause ▶/❚❚	Slow/F.Advance ❚▶	Review ◀◀	Cue ▶▶	Insert

A description of the button functions in the Display modes is given below.

- **Title mode**

④ ⑤ LOCATION FORWARD/REVERSE

Press these buttons to move location of the individual title characters.

⑥ ⑦ CHARACTER FORWARD/REVERSE

Press these buttons to change a character in the title.

⑧ Title delete

Press this button to delete a character in the title.

- **Date/Title & Date mode**

④ Month Forward

Press this button to advance the month in the displayed date.

⑤ ⑥ Day forward/reverse

Press these buttons to change the day in the displayed date.

⑦ Year forward

Press this button to advance the year in the displayed date.

- **Lapse time/Title & Lapse time mode**

⑦ **Reset**
Press this button to reset the stopwatch.
A description of the button functions in the Camera Remote Control mode is given below.

- **Camera remote control**

④ **PLAY/PAUSE**
Press this button to pause the VCR or release the VCR from pause during playback.

⑤ **SLOW/F.ADV**
Press and hold this button to advance frames forward or show slow motion pictures during playback.

⑥ **REVIEW**
Hold this button down to display a reverse motion picture at 4 to 9 times of normal speed during playback.

⑦ **CUE**
Hold this button down to display a forward motion picture at 4 to 9 times of normal speed during playback.

⑧ **INSERT**
This is a editing mode control which is used to re-record on previously recorded tape without interference. You can get a smooth transition between two separate recordings on the same cassette. Press this button for RECORD/PAUSE mode and squeeze the camera trigger to add on the new recording.

Note that the original sound will not be changed.

⑨ **Display ON/OFF & VCR Information selector switch**
Press this button to view the displays or VCR information on the monitor. VCR information can be displayed only on the EVF monitor. This button puts the monitor displays on and off, and also turns on the VCR Information display.

Each time the switch is pressed, the display is changed in the following sequence.

→ **DISPLAY ON** → **DISPLAY OFF** → **VCR Information** →

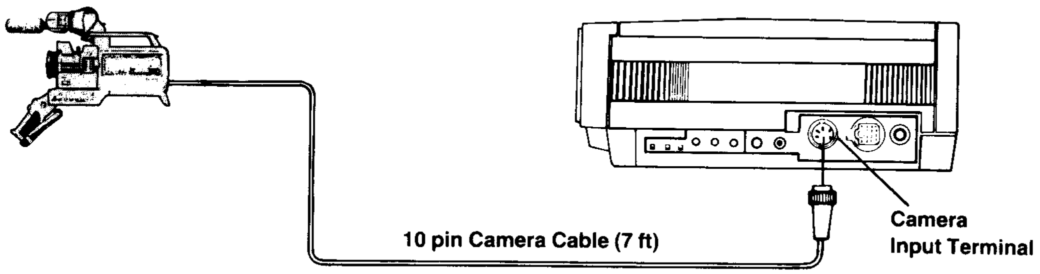
Note that when this switch is placed in the "DISPLAY OFF" or "VCR Information", the buttons related to the displays do not function.

⑩ **Color display selector switch**
Selects the color display on a color monitor.
3 colors (White/Green/Red) are available.

CONNECTION DIAGRAM

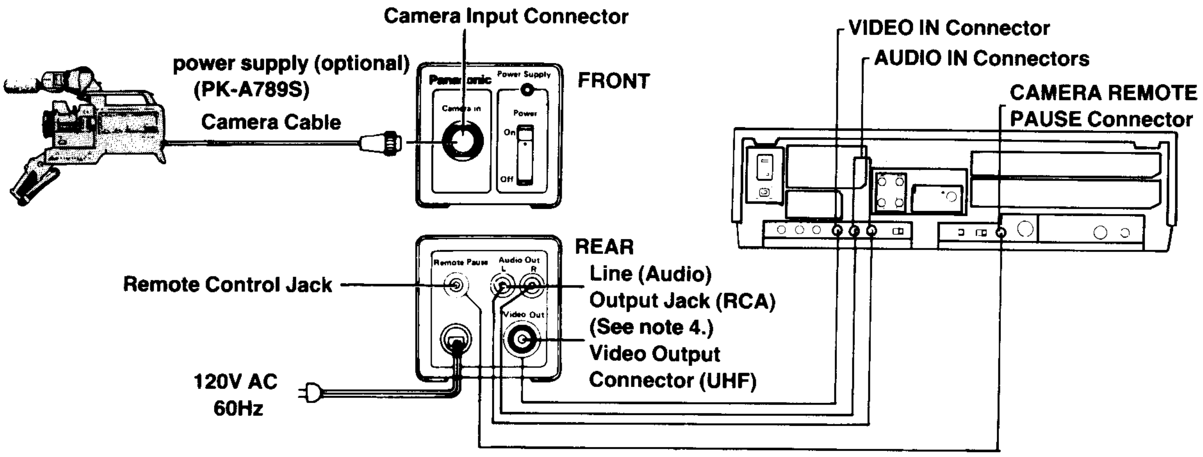
Note: All power switches should be OFF when making cable connections (connecting cables with power ON can damage the units).

A: Camera Head and VCR with 10-pin connector


10 pin Camera Cable (7 ft)
Camera
Input Terminal

Connect the camera cable to 10-pin socket on portable VCR as illustrated.

B: Camera Head, optional power supply and VCR without 10-pin connector (See note 3.)


Camera Input Connector
power supply (optional)
(PK-A789S)
Camera Cable
Panasonic
Power Supply
Camera in
Power
On
Off
FRONT
REAR
Remote Pause
Audio Out
L
R
Video Out
Remote Control Jack
Line (Audio)
Output Jack (RCA)
(See note 4.)
Video Output
Connector (UHF)
120V AC
60Hz
VIDEO IN Connector
AUDIO IN Connectors
CAMERA REMOTE
PAUSE Connector

a. Connect the camera cable from the camera head to the 10-pin camera socket on the power supply, (PK-A789S). (Make sure that the power switch of the power supply is turned off before connecting the cable.)
b. Connect the video cable from the VIDEO OUT socket (UHF connector) on the power supply to the VIDEO IN connector (RCA phono connector) on the VCR.
c. Connect the audio cables from the AUDIO OUT connectors (Left & Right) on the power supply to the AUDIO IN connectors (Left & Right) on the VCR.
d. Connect the VCR remote control cable from the REMOTE connector on the power supply to the REMOTE PAUSE connector on the VCR.
e. Plug the power plug of the power supply into the wall socket (120 Volts).
f. Insert the AC power plug of the VCR into the wall socket.

Notes:

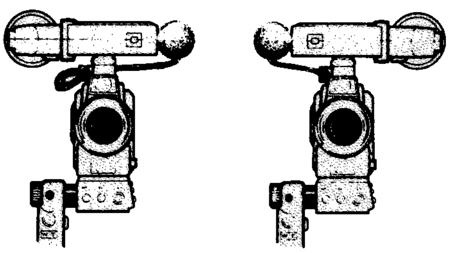
1. The camera cable between camera head and power supply or between camera head and portable VCR can be extended by using the optional extension camera cables.
   (Use three 20 feet extension cables to extend upto 67 feet)
2. The connections between the VCR and TV set are explained in the operating instructions for the VCR.
3. The remote control functions described on page 8 and the Record/Review feature described on page 3 are not operational when camera is used with the power supply.
4. Power supplies which do not have provision for stereo (such as model PK-A789) will have only a single channel audio connector.

C: Camera Head and Electronic Viewfinder (EVF)

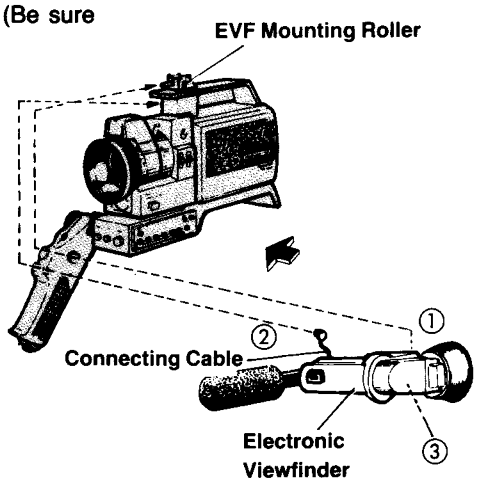
1. Attach the Electronic viewfinder to the camera head, tighten the EVF Mounting roller firmly, and lock with EVF lock lever.
2. Plug the connecting cable on the Electronic Viewfinder into the connector on the camera head.
3. Set the picture turning switch to the "R" position.
   (Be sure power is OFF when operating this switch.)

Note:
The above procedure is for mounting the Electronic Viewfinder for right hand and right eye use.
When mounting the Electronic Viewfinder for left hand and left eye use, unscrew the EVF Mounting roller, flip the viewfinder over and reattach by following the same procedure.
Also, place the picture turning switch in the "L" position. (Be sure power is OFF when operating this switch.)

Left Hand Operation **Right Hand Operation**



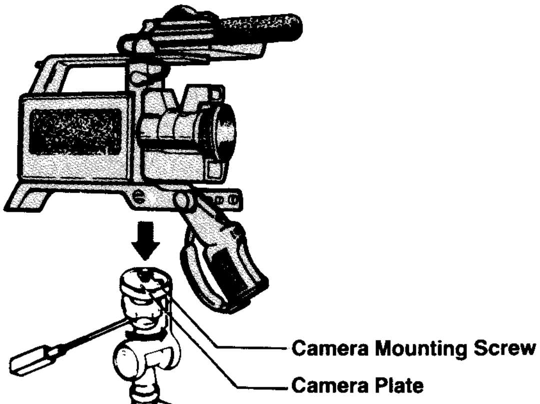
Front View of Camera



MOUNTING THE CAMERA ON THE TRIPOD

The camera may be attached to a tripod when you wish to make recordings while not holding the camera or if you need to keep the camera very steady while recording.

MOUNTING THE CAMERA ON A TRIPOD
Mount the camera with shoulder pad onto the tripod by screwing the mounting screw on the tripod (standard 1/4"-20 thread) into the mounting hole on the shoulder pad. Also slide the EVF backward for easy viewing of EVF picture.



Be sure that the camera is securely fastened.
Be sure that the tripod is sturdy enough to hold the camera.

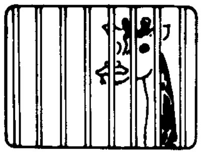
OPERATING PROCEDURE

PREPARING TO RECORD

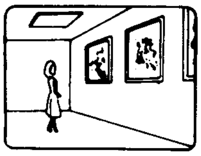
1. Connect the camera and VCR.
2. Turn on the VCR power and the camera power supply (if used).
   Note: On some VCR models, you may have to switch the input selector to the camera position.
3. If VCR has Camera remote feature, set the Camera Remote switch to the ON position.
4. Set the CAMERA/VCR switch to the CAMERA position.
5. Set the Standby/Operate switch to the Operate "STD" position.
   Note: • If Displays come on in Operate mode, press Display button once. This will remove the Displays if not wanted.
   • When using the Standby/Operate switch, be sure to place the camera remote switch of the VCR in the "ON" position.
6. Check that the green Record/Pause indicator in the viewfinder is off. If this LED is on, press the camera pause button on the handle grip. (this should put the VCR in the pause mode, and turn off the indicator).
7. White Balance Adjustment
   Notes: 1. When the camera is first turned on, permit warmup for approximately 30 seconds before adjusting white balance.
   2. Color controls should be in detent position for best results.
   3. Adjustment should be repeated for scenes of very different color conditions.
   a. Set the color temperature switch for indoor or outdoor use.
   b. Push iris control to the "in" position for automatic iris control.
   c. Remove the lens cover, and aim the camera at a white object or backgroud.
   (Do not aim at a light source). Camera need not be focused for this adjustment.
   d. Check that the Light Intensity Indicator is within the required range.
   Note: Sensitivity can be increased by sliding the Standby/Operate Switch (item 5 above) to the upper (GAIN UP) position.
   e. Push A.W.B. switch down, and hold for 2 to 3 seconds until the W.B. indicator glows green. This completes the White Balance Adjustment.
   Note: If the A.W.B. indicator glows red, optimal white balancing is not possible. The camera's adjustment range has been exceeded as a result of unfavorable lighting conditions — either insufficient illumination for white balancing or a light source with unfavorable color temperature. The camera then adjusts for the best value possible.
8. Camera Focusing
   Camera will automatically focus on a subject placed in the center of the EVF by pushing the Auto Focus button

For the following scene conditions, manual focusing is recommended.

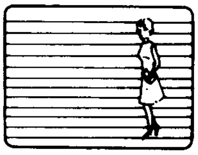
1. Scene with both far and near objects.



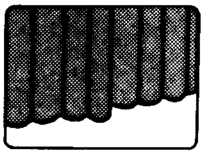
2. Perspective scene.



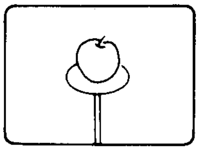
3. Scene with fine horizontal pattern.



4. None-reflective object such as a black curtain.



5. Small object: Note . . . . Auto focus system needs a reflected area. When camera to object distance is 3m, an object must have a reflected area which is greater than a circle of approx. 0.1m in diameter.



To operate in manual focus mode, the following focusing procedure shoud be performed.

a. Aim Camera at scene to be recorded.
b. Slide the Power Zoom switch to the T position and hold it until the lens has zoomed to maximum close up.
c. Rotate the lens barrel for the sharpest picture at the maximum close up setting. (It may be necessary to move back from the subject if sharp enough picture can not be obtained).
d. Operate the Power Zoom switch to the W position, Picture should stay in focus over the entire zoom range.

Note: Re-focussing may be required when the Camera is aimed at a new scene.

RECORDING

1. Press the Record and Play buttons on the VCR.

2. To start recording, press the Pause/Record button on the camera handle grip. The green REC indicator in the viewfinder will go on to show that actual recording is being made.

3. To pause recording, press the Pause/Record button a second time (REC indicator will go off).

4. To resume recording, press the Pause/Record button again.

5. To monitor the last few seconds of the recording, press the Record/Review button.
   Note: This feature does not operate when the power supply-to-VCR connection is used.

6. To conserve power during a long pause, return the Standby/Operate switch to the Standby position.
   Note: Always pause the recording before switching to standby to avoid video noise in the played back recording.

7. Fade In/Fade Out Feature
   To add this feature in a recording, press the Fader Switch to put it in the on position. Fade In and Fade Out will then operate as follows:
   Note: Fade in/out indicator glows steady when Fader is on and flashes during fade in or fade out.

   ### FADE IN

   When going from Pause to Record, the tape does not start rolling until the picture in the viewfinder is fully faded out. Then the tape rolls as the picture fades in.

   ### FADE OUT

   When going from Record to Pause, the recorder does not pause until the picture has fully faded out. After the recorder pauses, the picture that the camera is aiming at re-appears in the viewfinder in order to line up the next shot.

8. Power Zoom Feature
   To zoom in during recording, slide Power Zoom switch to the T position, and to zoom out, slide the switch to the W position.
   Notes: 1) The rate at which the camera zooms in or out can be adjusted with the zoom speed control

   2) For best results with automatic focusing, keep desired subject in the center of the viewfinder.
   3) When used with manual focusing, the Camera Focusing procedure given in steps a. thru d. above must be followed.

9. Display Functions
   Displays can be added to the recording. See pages 15 to 19 for descriptions and use of these functions. Refer also to the display function button descriptions on pages 6 and 7.

VIEWFINDER PLAYBACK

To view a replay of the recording, rewind the tape to the point where you wish to start the replay and press the Play button on the VCR. The playback picture will appear automatically on the camera viewfinder when connected to a portable VCR.
Note: This feature does not operate when the Power Supply-to-VCR connection is used.

CAMERA Remote Control Functions

Instructions for the use of the camera remote control functions are given on page 14. Refer also to page 8 for descriptions of the controls.

AUDIO RECORDING

The camera has a built-in stereo microphone which produces stereo sound recordings when used with a stereo VCR. To record in stereo, place the Stereo/Mono switches of both camera and VCR in the Stereo position.

Mixed stereo and monaural recordings can also be made by using external microphones and by using either the Mono or Stereo position of the Selector switches as shown in the tables below.

The following combinations of audio recordings can be made on a stereo VCR:

	STEREO VCR AUDIO RECORDING	**Position of Camera & VCR STEREO/MONO SWITCHES**
1.	Both channels of camera microphone on CH 1 (L)	Mono
2.	Camera left microphone on CH 1 (L) and external right microphone on CH 2 (R)	Stereo
3.	Camera left microphone and external right microphone both on CH 1 (L)	Mono
4.	Camera right microphone on CH 2 (R) and external left microphone on CH 1 (L)	Stereo
5.	Camera right microphone and external left microphone both on CH 1 (L)	Mono
6.	External left microphone on CH 1 (L) and external right microphone on CH 2 (R)	Stereo
7.	External left and right microphones both on CH 1 (L)	Mono

The following combinations of audio recordings can be made on a monaural VCR:

	MONAURAL VCR AUDIO RECORDING	**Position of Camera STEREO/NOMO SWITCH**
1.	Both channels of camera microphone	Mono
2.	Only left channel of camera microphone	Stereo
3.	Camera left microphone and external right microphone	Mono
4.	Only external left microphone	Stereo
5.	External left and external right microphones	Mono
6.	Camera right microphone and external left microphone	Mono

Note: When connecting with a monaural VCR, it is recommended that the STEREO/MONO selector switch is placed in the "MONAURAL" position since video noise may appear on the monitor in the "STEREO" position.

USING THE REMOTE CONTROL FUNCTIONS

When the camera is connected to the portable VCR (See note 7.) VCR functions (PLAY/PAUSE, SLOW/F.ADV, CUE, REVIEW, INSERT) can be controlled from the camera. Also, all playback functions can be viewed in the electronic viewfinder. For these operations, place the camera remote switch on the VCR to the "ON" position. (See note 8.)

OPERATION

1. Connect the camera to the recorder.
2. Turn the recorder power "ON".
3. Set the recorder's CAMERA REMOTE switch "ON".

TO RECORD

1. Place the VCR/CAMERA switch in the "CAMERA" position.
2. Use the camera handle grip trigger to engage or release pause.

TO PLAYBACK

1. Place the VCR/CAMERA switch (item ①) in the "VCR" position.
2. Use the PLAY/PAUSE button (items ④) to engage or release pause.
3. Use CUE or REVIEW (items ⑥ and ⑦) to locate a particular segment.
4. Use SLOW/F. ADV (item ⑤) as desired.

Note: Refer to page 6 for the Control Panel switch items indicated.

TO STOP OPERATION

1. Set the camera remote switch of the recorder to "OFF".
2. Operate VCR rewind or STOP function buttons as desired.

TO INSERT

If you wish to INSERT a new video section to a previously recorded tape without erasing the original sound recording.

1. Place the VCR/CAMERA selector in the "VCR" position.
2. Use CUE or REVIEW to find the particular section. (See note 6.)
3. Press the "INSERT" button to place the VCR in the RECORD/PAUSE mode (INSERT/PAUSE mode).
4. Squeeze the camera handle grip trigger to add on the new video recording.
5. Use the camera handle grip trigger to engage or release pause.

Note:

1. STANDBY has top priority in any mode.
2. Switching the VCR/CAMERA selector automatically engages the pause mode.
3. If the safety tab of the cassette is missing, no recording can be made.
4. If the tape comes to its end while the remote control is used in RECORD/PAUSE mode,
   — the recorder's power switch will automatically turn off.
5. When the "INSERT" button is pressed and VCR is in the RECORD/PAUSE mode, VCR reverts to PLAY/PAUSE mode when the tape counter reaches "0000" and the Memory switch of the VCR is "ON".
6. If using normal play mode to find particular section where insert is to be added, put in pause mode before pressing INSERT button.
7. All the above functions are operable only with a VCR which has Camera Remote feature such as the PV-6000 portable VCR models. Refer to VCR instruction manual for other models.
8. When the camera remote switch on the portable VCR is placed in the "OFF" position, "REMOTE OFF" flashes on the EVF monitor with VCR information.
9. When the INSERT button is pressed to place the VCR in the INSERT/PAUSE mode, it also functions as the DELETE button in the title mode. To prevent the character from deleting, move the cursor at least two spaces away so that pressing the INSERT button does not affect the title composed.

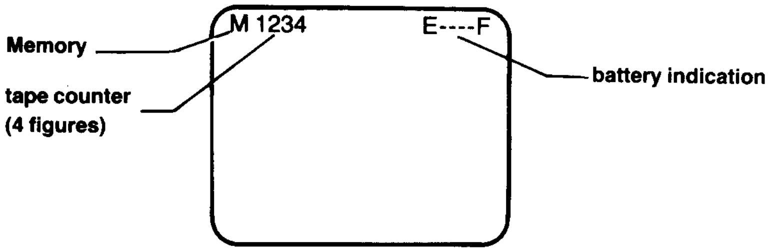
DISPLAYS ON THE CRT OF ELECTRONIC VIEWFINDER

When the camera is connected to the portable VCR, the following indications can be made to appear on the CRT.

Note: When a color monitor is used, white, green, or red color displays can be selected with the color switch. The monitor displays can also be made to appear in black, magenta or cyan by placing the Normal/Reverse switch in the Reverse position. For best results when editing the displays in Reverse color mode, close down the iris or cover the lens.

1. **VCR INFORMATION**

Set the DISPLAY ON/OFF and VCR Information selector switch to the "VCR Information" position.
VCR INFORMATION can't be recorded and is not affected by the VCR/CAMERA selector switch.
VCR INFORMATION can be seen in the Electronic viewfinder.



1—1. Tape counter & Memory

Tape counter indicates how far the tape has moved. It is very useful for locating the beginning of programs. Memory and tape counter will be indicated in conjunction with the liquid crystal display counter on the VCR.

1—2. Battery indication

E ---- F
E --- F
E -- F
E - F

The battery indicator displays the charge capacity of the battery pack within the recorder. Hyphens between "E" and "F" are extinguished as the charge capacity reduces. The last hyphen flashes just before the VCR turns itself OFF to protect the battery.

※VCR INFORMATION appears when the VCR/CAMERA selector switch is in either the "CAMERA" or the "VCR" position.

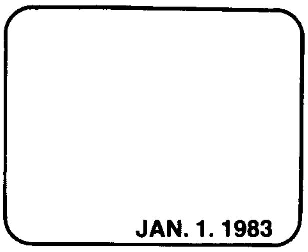
※All the buttons related to the displays will not function when the VCR Information is displayed on the EVF monitor.

For the following displays, refer to the control panel diagram on page 6 and the display functions chart on page 7.

2. DATE

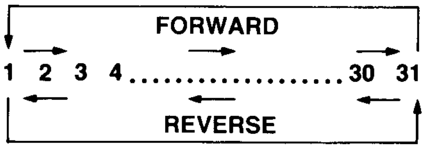
Date will be displayed and can be recorded when the Display Mode selector switch is placed in the "DATE" or Title & Date position after placing the VCR in the Record/Pause mode.

"JAN. 1. 1983" appears when the power is first turned on. The date can be adbanced to "DEC 31. 1999".



TO CHANGE THE DAY

Press the "DAY FORWARD" button (item ⑤) or "DAY REVERSE" button (item ⑥) to change the day.



DAY OF MONTH CHANGE SEQUENCE

TO ADVANCE THE MONTH

Press the "MONTH" button (item ④) to advance the month.

→JAN→FEB→MAR→APR→MAY→JUN→JUL→AUG→SEP→OCT→NOV→DEC

MONTH CHANGE SEQUENCE

TO ADVANCE THE YEAR

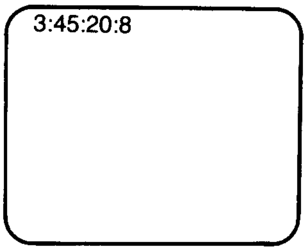
Press the "YEAR" button (item ⑦) to advance the year.

→ 83→84→85.....98→99→80→81→82

YEAR CHANGE SEQUENCE

3. Lapse time

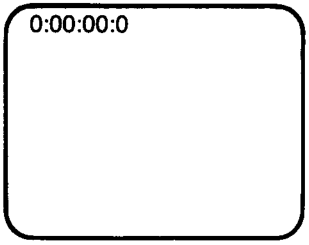
Lapse time will be displayed on the CRT and can be recorded when the Display Mode selector switch is placed in the Lapse time or Title & Lapse time mode. Lapse time starts or stops every time the camera pause trigger is pressed. Be sure to place the VCR in the RECORD/PAUSE mode by switching the Control Panel CAMERA/VCR switch (item ①) to the "CAMERA" position. Should you decide not to record the lapse time display, button (item ⑨) on the Control Panel. The lapse time display will be recorded when displayed in the Electronic Viewfinder and the green LED pause indicator is lit.



Stopwatch display
3 hours 45 minutes 20 seconds
and $\frac{8}{10}$seconds.

TO RESET

Press the "RESET" switch (item ⑦) when stopwatch is stopped during stopwatch display.
Stopwatch time accumulates until the "RESET" switch is pressed.

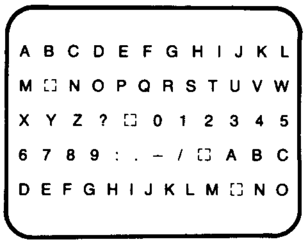


When the stopwatch reaches "9:59:59:9", it reverts to "0:00:00:0".

4. TITLE

You can produce your own titles by placing the Display Mode selector switch in the "TITLE" position.
Titles can be recorded. Be sure to place the VCR in the RECORD/PAUSE mode (VCR/CAMERA switch in "Camera" position).
60 positions are available as shown below.

Title will be retained in memory approx. 12 hours after turning the camera power off. Random characters may be seen for the first 2 ~ 3 seconds after the camera power is turned on during the memory time of approx. 12 hours. To memorize the title, keep the camera power on for at least 5 minutes after composing the title.



12 columns

Sequence of characters (alphabet, number, sign)

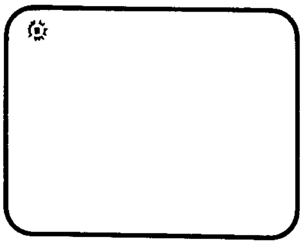
No character display ↓ (flashing cursor appears to locate the position.)

A B C D E F G H I J K L M ⬚

N O P Q R S T U V W X Y Z ? ⬚

0 1 2 3 4 5 6 7 8 9 : . – / ⬚

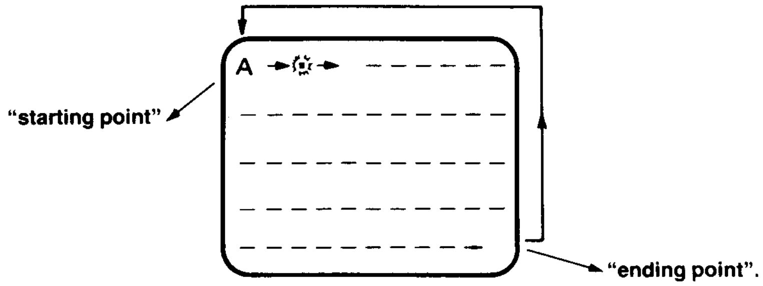
When the display selector switch is set to "TITLE" position, flashing cursor or character appears first at the upper left corner as shown. When the flashing cursor or character disappears from the monitor, press the Delete button.
This will reset the display, and return the flashing cursor to the upper left corner.



The flashing cursor ☼ indicates the location at which the character is to be displayed.

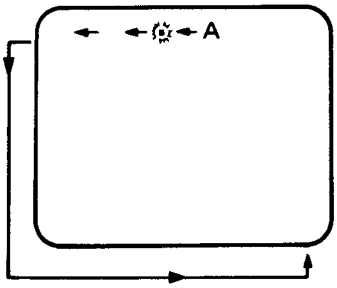
TO ADVANCE THE LOCATION

Press the "LOCATION FORWARD" button to advance the location. When the location reaches the lower right corner of the CRT, the location reverts to the "starting point".


A
"starting point"
"ending point".

TO REVERSE THE LOCATION

Press the "LOCATION REVERSE" button to reverse the location.



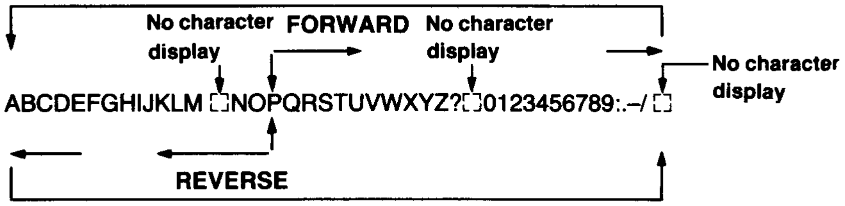
When the location returns to the "starting point" the location moves to the "ending point" as shown.

Note:

1. Once characters are displayed, a character flashes at the position where it can be changed by pressing the CHARACTER FORWARD/REVERSE buttons.
2. Flashing of the character and cursor disappear during recording. Cursor is not recorded.

TO CHANGE A CHARACTER

Press the "CHARACTER FORWARD" button or "CHARACTER REVERSE" button to change the character in the sequence shown in the diagram below.
These two buttons do not change the location of the character.

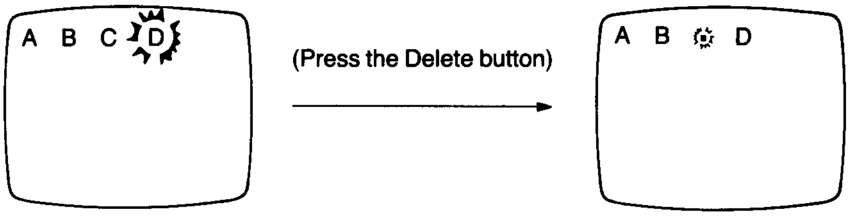

No character display
FORWARD
No character display
No character display
ABCDEFGHIJKLM ⬚NOPQRSTUVWXYZ?⬚0123456789:.-/ ⬚
REVERSE

For instance, if the character "P" is being displayed, "Q" will appear on the CRT when the "CHARACTER FORWARD" button is pressed. Also, "O" will appear when the "CHARACTER REVERSE" button is pressed.
In this way, everytime the "CHARACTER FORWARD" or "CHARACTER REVERSE" button is pressed, the character will be changed in sequence.
Note: If button is pressed and held, character will change continually.
When the character reaches the last ⬚ during FORWARD, it returns to the "A".
Also, when the character reaches the "A" during REVERSE it returns to the last ⬚ (No character display).

To delete the character

This function operates differently from the character change function. Flashing cursor or character is located to the right of the character to be deleted as shown on the left diagram.

Pressing the Delete button then deletes the character as shown on the right diagram.

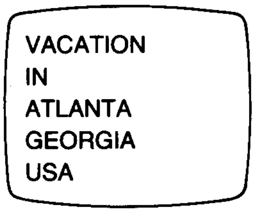

A B C D
(Press the Delete button)
A B D

5. Title & Date

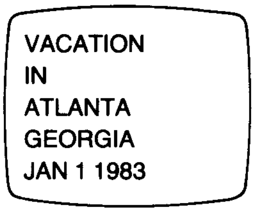
When the title display is changed to the Title & Date display by pressing the Display Mode selector switch, both title and date will be displayed (Title can't be changed but can be recorded).

Date display position is changed by pressing the position selector switch.

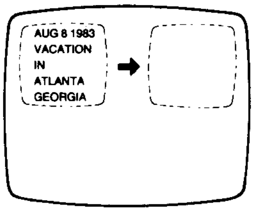
For instance


VACATION
IN
ATLANTA
GEORGIA
USA

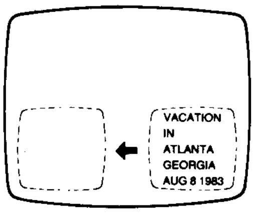
- Compose the title at position-1 while in the title display mode.


VACATION
IN
ATLANTA
GEORGIA
JAN 1 1983

- Set to the Title & Date display by pressing the Display Mode selector switch.
- The word "USA" in the last row will not be displayed but memorized.
- Change the date as desired.


AUG 8 1983
VACATION
IN
ATLANTA
GEORGIA

- Set to position-2 or position-3 by pressing the position selector switch.
- Date will be displayed in the first row at the position-2 or position-3.

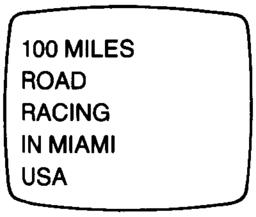

VACATION
IN
ATLANTA
GEORGIA
AUG 8 1983

- At position-4 or position-5, date will be displayed in the last row as it was at position-1.

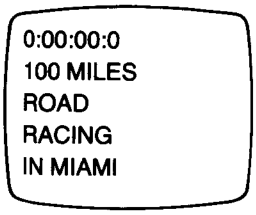
6.Title & Lapse time

When the Title display is changed to the Title & Lapse time display by pressing the Display Mode selector switch, both title and stopwatch will be displayed (Title can't be changed but can be recorded).

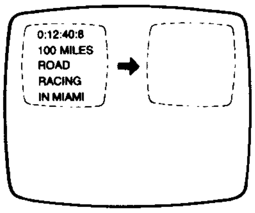
For instance


100 MILES
ROAD
RACING
IN MIAMI
USA

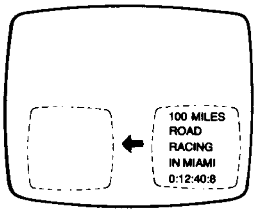
- Compose the title at position-1 while in the title display mode.


0:00:00:0
100 MILES
ROAD
RACING
IN MIAMI

- Set to the Title & Lapse time display by pressing the Display Mode selector switch.
- Stopwatch appears in the first row.
- The word "USA" in the last row will not be displayed but memorized.
- Start or stop the stopwatch by pressing the camera pause trigger switch.


0:12:40:8
100 MILES
ROAD
RACING
IN MIAMI

- When the position is changed to position-2 or position-3 by pressing the position selector switch, stopwatch will be displayed in the first row.

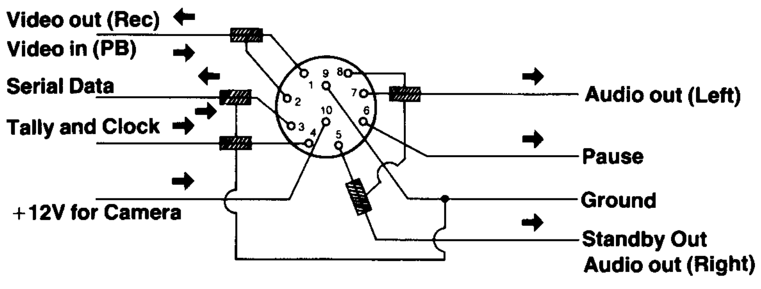

100 MILES
ROAD
RACING
IN MIAMI
0:12:40:8

- At position-4 or position-5, stopwatch will be displayed in the last row.

BEFORE SERVICING

Condition	Main Cause and Remedy
No picture	• Check that the Power Supply is plugged in (When using the Power Supply – to – VCR connection). • Check that the Standby switch is set to the "Operate" position. • Check that the VCR power switch is on – and the battery is charged. • Check that the lens cap is off. • Check that all necessary cables are connected correctly. • Allow approx. half a minute for picture to appear on viewfinder when camera power is first turned on. This is normal.
Color Balance not proper	• Check that lighting is adequate. • Check the color temperature correction switch for proper setting. • White Balance may need to be readjusted.
Color rendition not proper	• Check that the color TV is adjusted properly. • Check that the lighting is adequate. (Insufficient lighting can considerably alter color rendition.)
Viewfinder picture is upside down	• Turn camera power off. Then place the picture turning switch in the proper position.
VCR does not pause immediately when the trigger is squeezed.	• This is normal if the Fader switch is on.
Camera remote control does not operate.	• Check that the camera remote switch of the VCR is set to "ON" position. • Check that the VCR/CAMERA selector switch is placed in the proper position.
Focus is not sharp	• Check that the surface of the lens is not dirty or dusty. • Check that the lens is properly focused. • Check that the Auto Focus switch is being pushed.
Color for indoor or outdoor is not correct	• Check that the color temperature correction switch is properly set. • Color control knob may need to be adjusted.
Recording does not operate	■ When the Remote control is used, • Check that the remote pause cable is correctly connected. (When a home video recorder is used) • Check that the camera cable is properly connected to the portable VCR.

10 Pin Camera Connector Diagram



GENERAL DESCRIPTION

(1) Newvicon Tube

The Newvicon pick-up tube uses a new photo-conductive material (ZnSe-ZnCdTe) that is extremely sensitive and free from burning. These properties make the Newvicon highly suitable for use in low-illumination surveillance cameras.
This camera has a 2/3"-type Newvicon image receiving tube which uses the electrostatic focus and magnetic deflection system. The integral stripe filter in this system is coated with two layers of the new photo-conductive material, which gives the camera a high degree of sensitivity and color reproducibility totally free from burning.
Conventional electromagnetic focus/deflection pick-up tube systems use external focus coils which form electronic lenses in the pick-up tube, allowing the DC current to flow in the coils so that the beams are focuses on the target.
The new electrostatic focus/magnetic deflection pick-up tube system. However, uses electrodes to focus the beams on the target (Fig. 2), thus reducing power consumption by saving the power otherwise needed to drive the focus coils and reducing the power needed for magnetic deflection.

The electronic beam from the guard is accelerated by G2, then passes through the beam limiting aperture in order to generate fine-diameter beams. These beams are then focused by the electrostatic lens composed of G3, G4, and G5. This electrostatic lens replaces the conventional focus coils and circuits.
G5 and G6 form a coillimating lens, through which the beams are deflected so that they always hit the target at the proper 90° angle. This improves the resolution around the edges of the lens.
Note:
A beam adjustment magnet in the deflection assembly adjusts the magnetism so that the beams are always focussed in the center of the target.

Because the effective diameter of the focus is very small, the beam adjustment magnet must be adjusted with extreme care to prevent decreased picture resolution and dim colors.

Note:
The deflection assembly consists of the horizontal/vertical deflection coils and beam adjustment magnet.

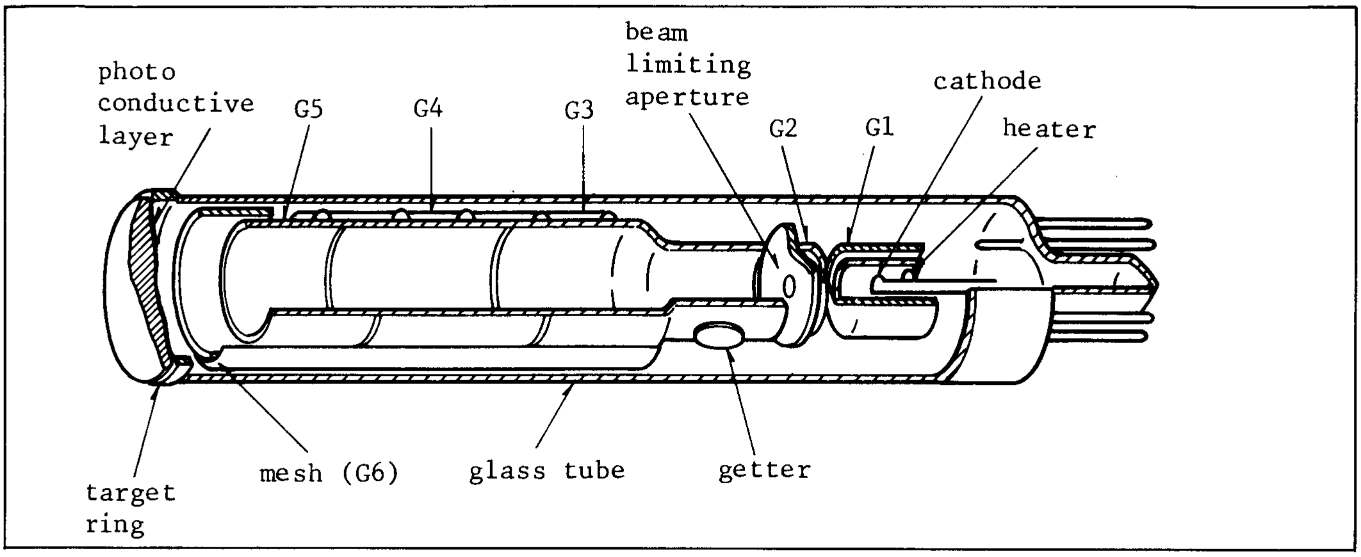
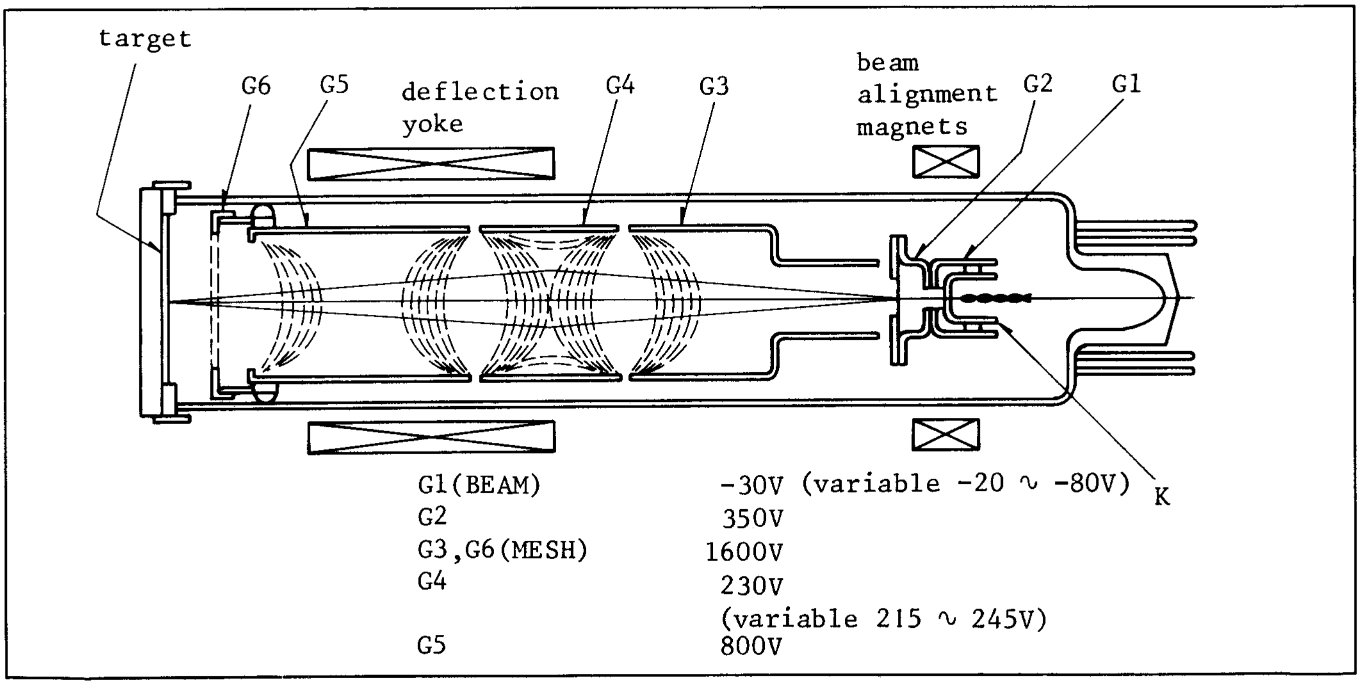


photo conductive layer
G5
G4
G3
beam limiting aperture
G2
G1
cathode
heater
target ring
mesh (G6)
glass tube
getter

Fig. 1. Construction Detalls of The Newvicon


target
G6
G5
deflection yoke
G4
G3
beam alignment magnets
G2
G1
K

G1(BEAM)	-30V (variable -20 ∿ -80V)
G2	350V
G3,G6(MESH)	1600V
G4	230V (variable 215 ∿ 245V)
G5	800V

Fig. 2. Electrostatic Focus Lens Construction

(2) Basic Principle of Pick-up Tube

The lens gathers the light from the scene and focuses it onto the face of the pick-up tube. The photoconductive layer creates a number of individual target elements. These elements are made up of electrostatic capacitance parallelled by light-dependent resistors (Fig. 3) forming an RC time constant.

The electrostatic capacitance is basically formed between the nessa glass and the back surface, where the beam strikes the photo-conductive layer which acts as a dielectric. The target elements are all connected on one end to the signal electrode. The other end is unterminated and ready to receive the beam.

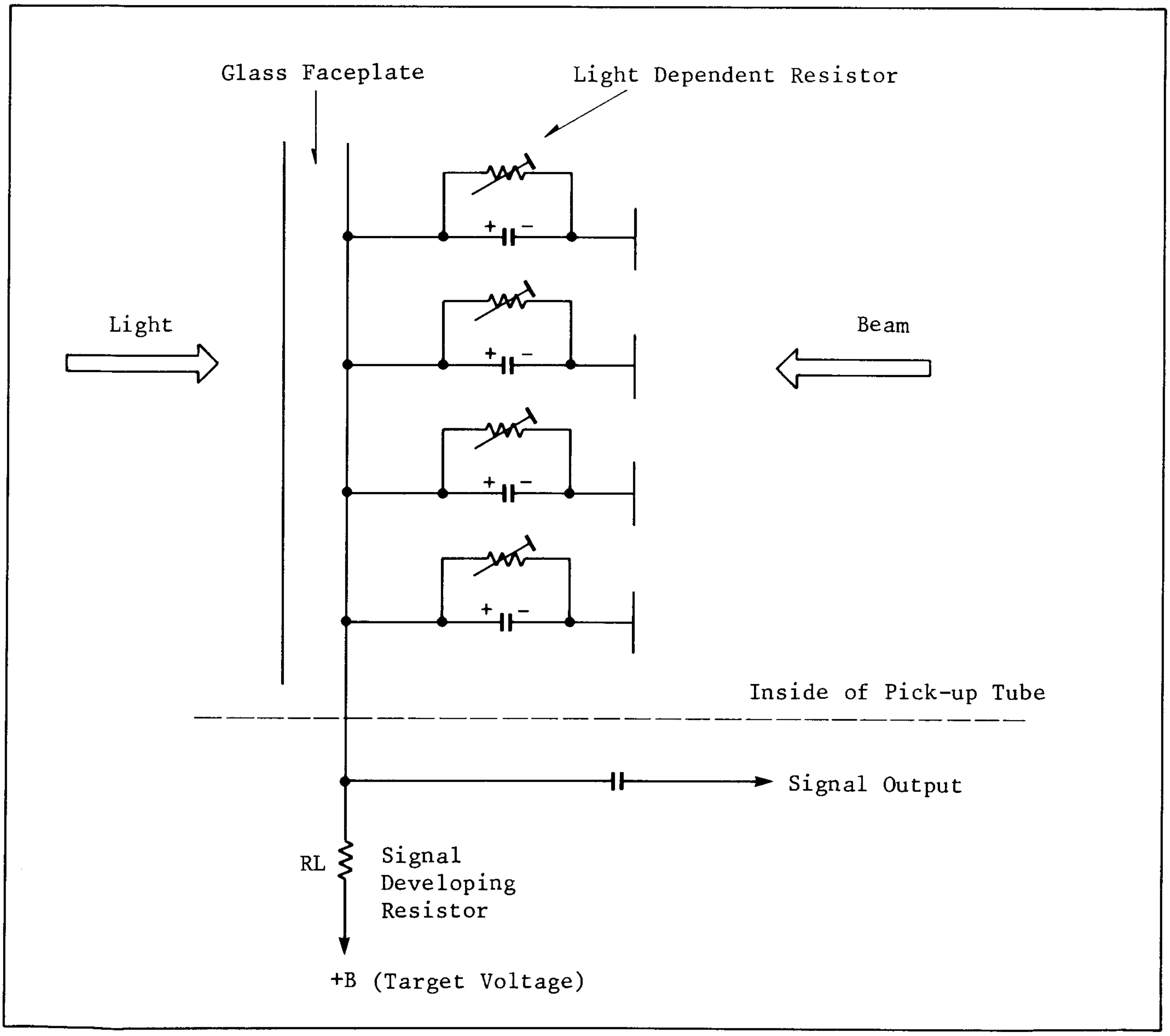

Glass Faceplate
Light Dependent Resistor
Light
Beam
+
−
Inside of Pick-up Tube
Signal Output
RL
Signal Developing Resistor
+B (Target Voltage)

Fig. 3. Target of Pick-up Tube

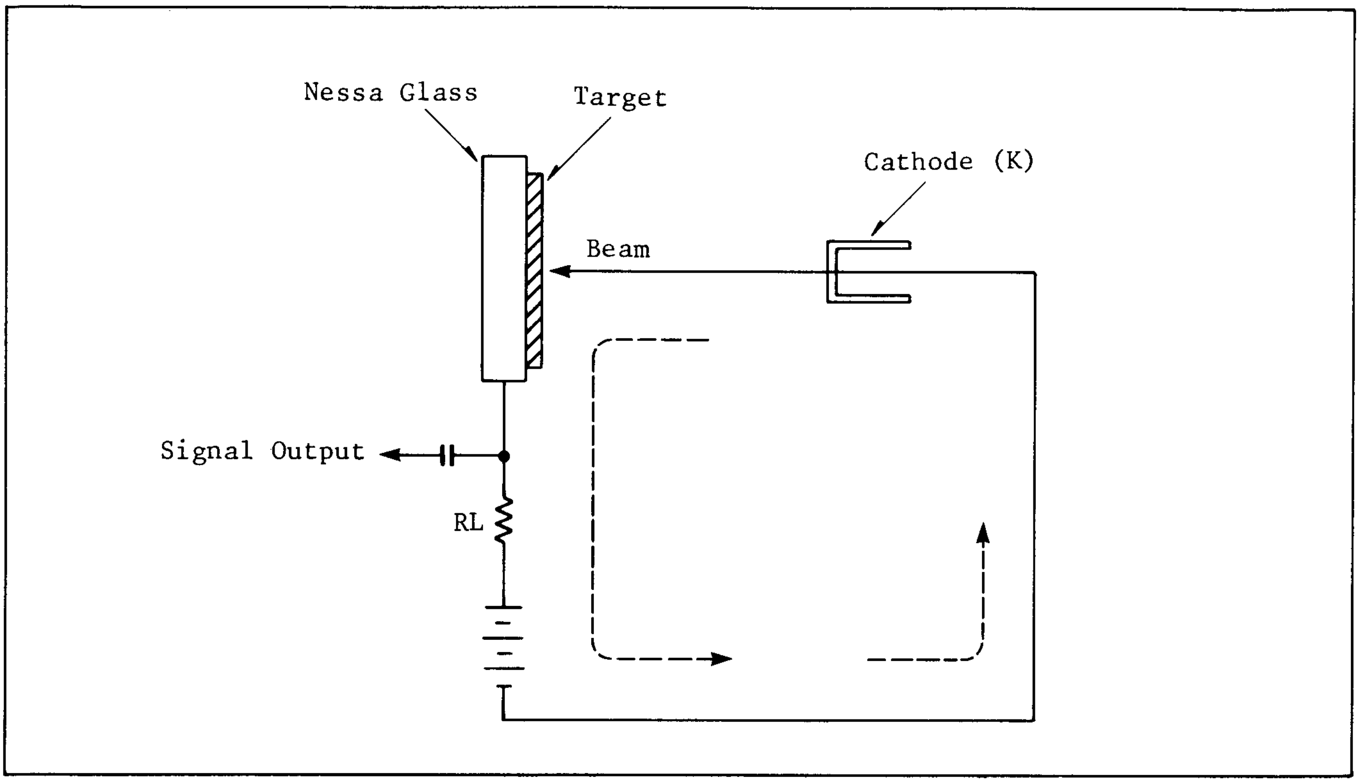


Fig. 4. Electron Path

When there is no light striking the face plate of the pick-up tube, the light dependent resistors create a high resistance. Whenever light hits the face of target area, the resistance drops--the level depending on the amount or intensity of the light.
When a positive voltage is applied to the target (target potential), all the RC networks or elements will charge as the beam first scans the target area.
When the beam is not in contact with the element, the capacitor will slowly discharge through the light-dependent resistor connected across it. Keep in mind that each element's resistance will vary depending on the light level. On subsequent scans of the beam, the capacitors will re-charge back to the target potential. It is this charging current that is sensed to produce the video signal. When the beam scans the target, electrons are deposited on the positively-charge areas, which will return them to the negative potential of the cathode. This causes current to be produced which flows through the external signal developing resistor RL (see Fig. 4), and it's this changing current (dependent on light) which is the converted optical image.

(3) Description of the Newvicon Electronic Circuits

The Newvicon pick-up tube is distinguished by the newly-introduced photo-conductive material composed of zinc selenium and the annealed bond of zinc tellurium/cadmium tellurium (ZnSe-ZnCdTe) that is coated in two layers on the stripe filter of the tube.

New Features

1. Dark Current Characteristics
   The Newvicon tube can be satisfactorily operated by using less than one-fortieth of the dark current that is constantly needed to drive conventional vidicon tubes.
   Also, even though the illumination signal level is extremely low, due to the stable flow of the dark current, the Newvicon tube produces a very clear picture at all times.
2. Residual Image
   The Newvicon tube reduces the residual image to one half the level of conventional vidicons. Even though the illumination is noticeably low, the Newvicon tube displays sharply improved performance.
3. Removal of the "Blooming"
   Silicon-based vidicon tubes are usually used when high sensitivity is required. However, the image produced by this tube adversely affects the peripheral portions of the picture when an intense light is sent in the tube, and as a result, the image can be visually multiplied several times the actual size. This is called "Blooming".
4. High Resolution
   The resolution of the Newvicon tube can be controlled, depending on the size of the beams. Thus, like the conventional vidicon tubes, the Newvicon tube has a very high resolution.
5. No Stationary Burn
   The Newvicon tube is virtually free from burn under normal conditions. Very slight burning may occur if the tube has continuously received an image with a drastic contrast in light, however, it will never remain on the tube permanently.
6. Photo-Electric Conversion Characteristics
   Since the gamma characteristic is held constant at 1.0 in the Newvicon tube, very satisfactory color balance can always be assured.
7. Dark Shading
   Due to the short flow of the dark current, the Newvicon tube can basically do away with the dark shading compensation circuit otherwise needed for the deflection circuit.
   The Newvicon tube detects the optical black (OB) current in the same way as conventional vidicons, by controlling the width of the OB current at 3.5μsec. using the right end of the tube.
   The Newvicon tube needs only 0.3 to 0.4nA of dark current during operation, whereas a conventional vidicon tube needs about 20nA. However, since the signal characteristics are not sufficient during the rise-up, as the equilibrating means, about 15nA of the dark current is fed to the Newvicon as a means of establishing equilibrium by referring to the bias light.

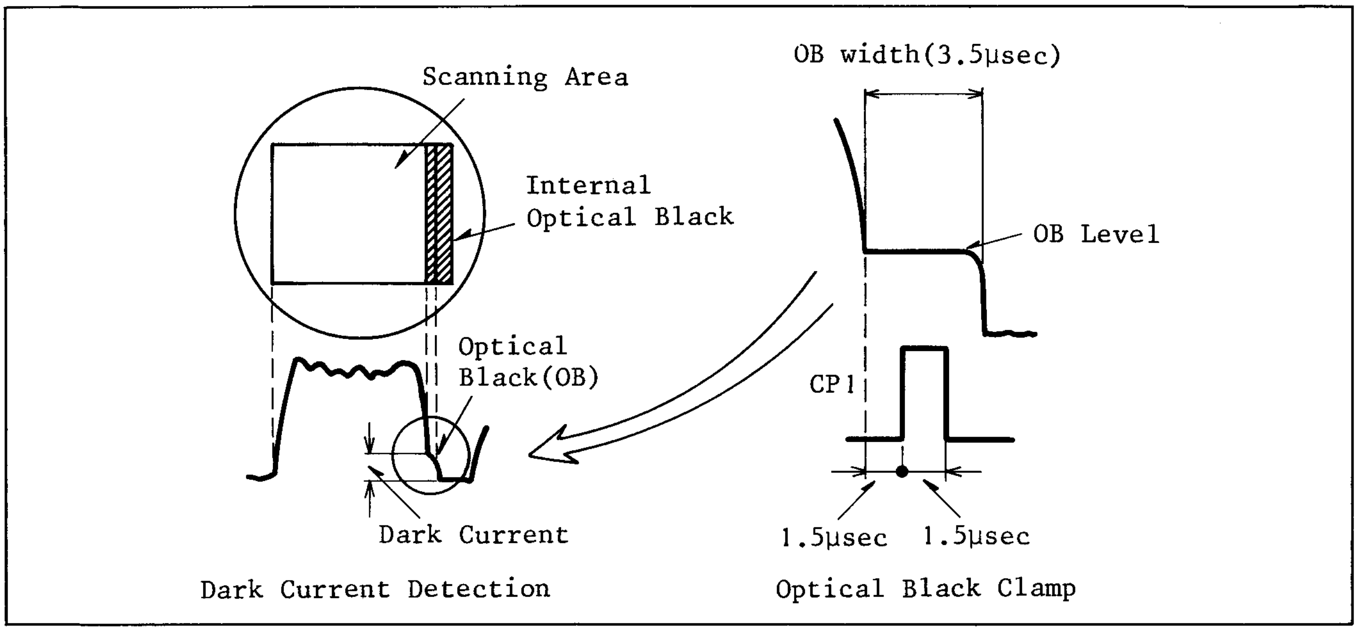

Scanning Area
Internal Optical Black
Optical Black(OB)
Dark Current
Dark Current Detection
OB width(3.5μsec)
OB Level
CP1
1.5μsec
1.5μsec
Optical Black Clamp

Fig. 5.

(4) Versatility of the Newvicon Video Camera

As in conventional vidicon camera, the Newvicon video camera can effectively be applied to a variety of uses; surveillance, industrial and medical applications, plus personal indoor/outdoor entertainment. The Newvicon video camera is particularily advantageous when a conventional vidicon camera does not have the required sensitivity, or when burning is a critical problem.

1. Surveillance in the Low-Illumination Sites
   The Newvicon video camera is ideally suited for surveillance of warehouses, parking areas, and other facilities where special illumination is not available.
   Under bulb-illumination, the Newvicon tube has the same sensitivity as the silicon-based vidicon tube which has the highest sensitivity. However, under fluorescent lamp illumination, the Newvicon tube surpasses the silicon tube in sensitivity.

2. For Connection to an X-Ray TV Set
   Since the Newvicon tube is highly sensitive to the fluorescent surface of the image intensifier of an X-ray receiving TV monitor, the operator can minimize the potential hazard of X-ray exposure during operation. Also, since the residual image is controlled at the proper level, the quantizing noise can also be minimized, enabling the viewer to view the image more comfortably.

(5) Bias Light Circuit

In order to obtain improved low-illumination characteristics of the Newvicon tube, a very small current (about 20nA) is fed to the Newvicon tube.
The bias light circuit consists of four Red LEDs. When the power is On, they feed a certain amount of light to the Newvicon film so that the residual image can be minimized.

These four Red LEDs are installed at the upper rear end of the Newvicon tube as shown in the drawings below, and the light is applied to the tube film through the wall of the tube.

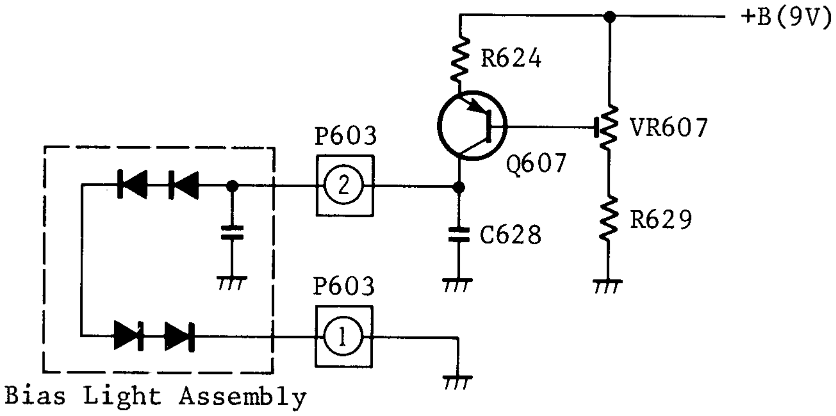

+B(9V)
R624
P603
Q607
VR607
②
C628
R629
P603
①
Bias Light Assembly

Fig. 6.

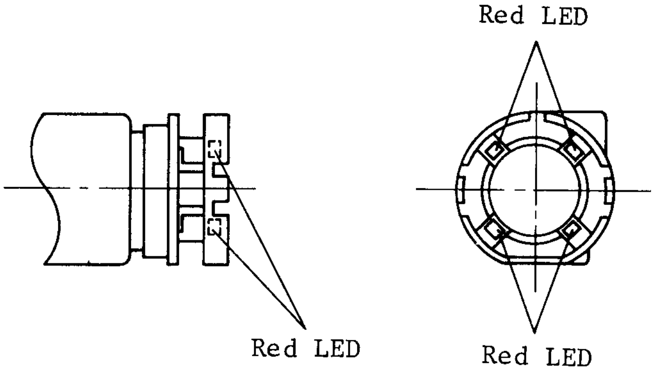

Red LED
Red LED
Red LED

Fig. 7.

(6) Gamma Characteristics

The gamma characteristics are identical to the photo-electric conversion characteristics.
When indirect light hit the target, the signal output increases. The relationship of the incident light and the signal output is called "Gamma", or "Transfer Characteristic".
The Newvicon tube has a maximum gamma value of 1.0, while the cathode ray picture tube has a transfer characteristic with a maximum value of 2.2.
In order to properly control the photo-electric conversion characteristics and cope with the 2.2 gamma value of the cathode ray picture tube, the gamma value of the video camera must be carefully set at 0.45 by means of the electronic circuit.
The Newvicon video camera uses a vidicon that has a maximum gamma value of 0.7, allowing the electronic circuit to precisely control the gamma value for the camera at a constant 1.0.

(7) Stripe Filter

The operation of the stripe filter on the face plate of the pick-up tube depends on several facts which bear review. The composition of what is perceived as white light is a mixture of many wave-lengths, which we can group by wavelength or color, as shown in Fig. 8-(A).
While it may be apparent that all the wavelengths or colors will pass through a transparent filter, one must consider the operation of a filter of complimentary colors.
In a tricolor system of colorimetry (Fig. 8-(B)), any two primary colors may be mixed to form a secondary color which is not one of the original three primary colors but the exact opposite of the unused primary color. White light passed through a filter of this new, secondary color will contain both of the original colors but none of the complementary color. Imagine a filter of yellow, a color which is made from Red and Green (Fig. 8).

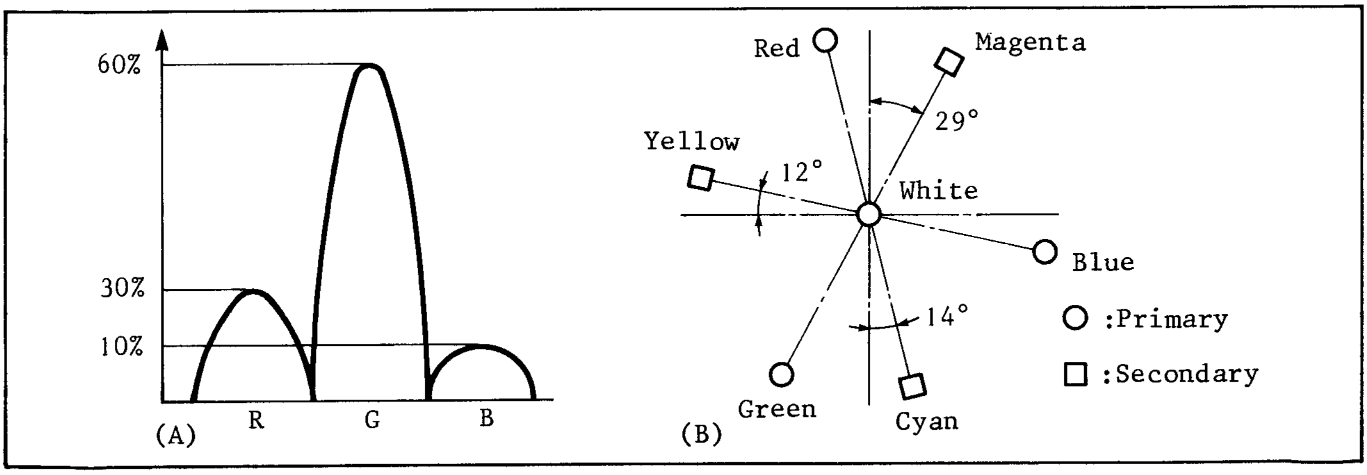


Fig. 8. Amplitude and Phase Relations Between R,G and B.

Should white light be passed through this yellow filter, Red, Green and some Magenta and Cyan light will pass, but blue light will not pass. Similarly, if a cyan filter were used, all but Red would pass. Lastly, the use of a color filter will of course allow the passage of image details--for example, the shape, outline and reflectance of the objects seen by a lens--if an image were used in place of the white light described above.

The stripe filter pick-up tube is based on these three details:

1. The color of any object can be carried by the information in the three primary colors.
2. When red, blue and green are used as the primary colors, 56% of the visual information and light energy is green. (Fig. 11-(A)).
3. A cyan filter will pass green and blue (but not red) (Fig. 10) and a yellow filter will pass green and red (but not blue) (Fig. 10).

Now let's discuss the color portion of the pick-up tube. When a thin film filter such as that depicted below is placed on the face plate, both the filter stripes and the image from the camera lens will be in focus without the use of additional lenses.

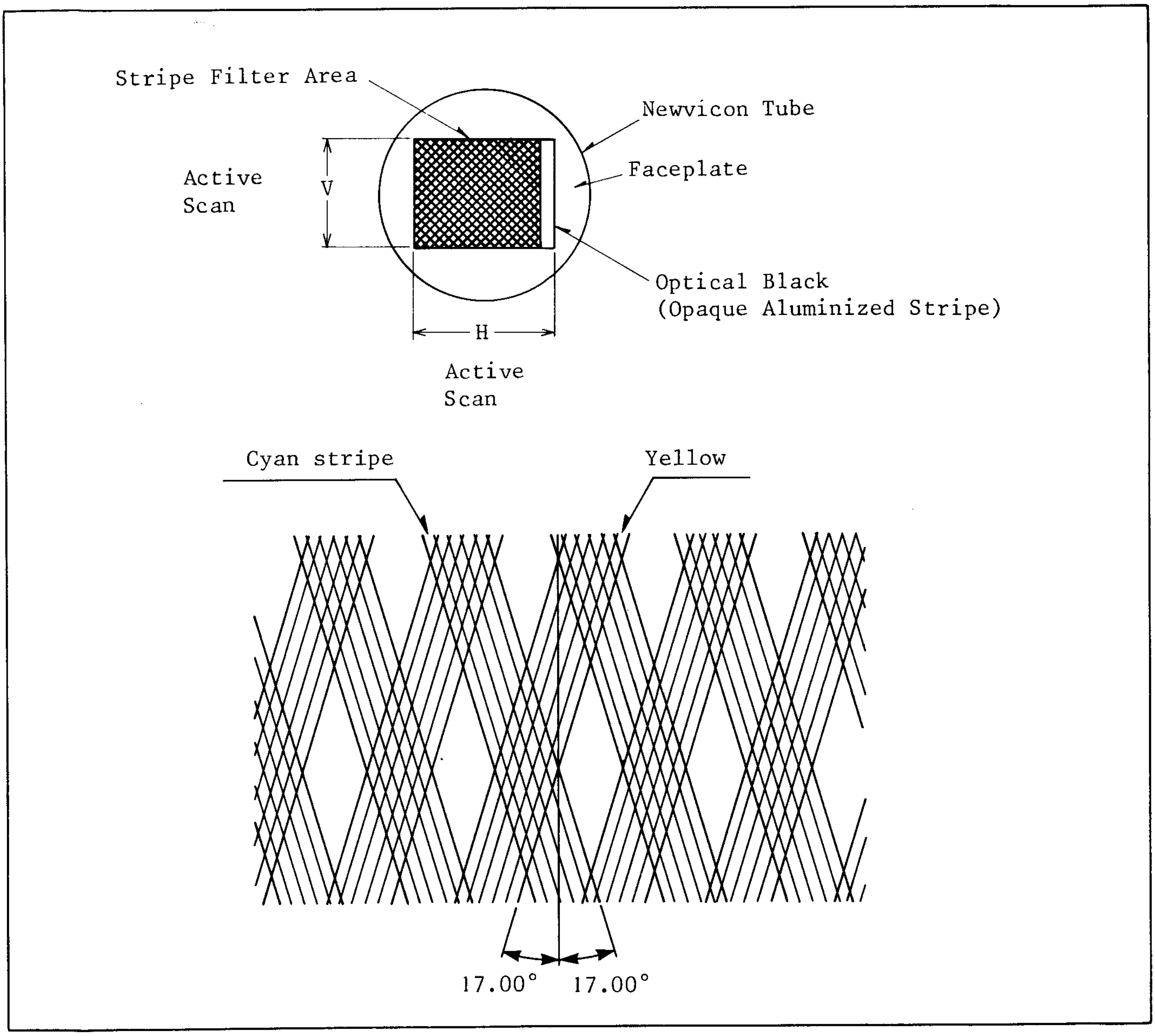
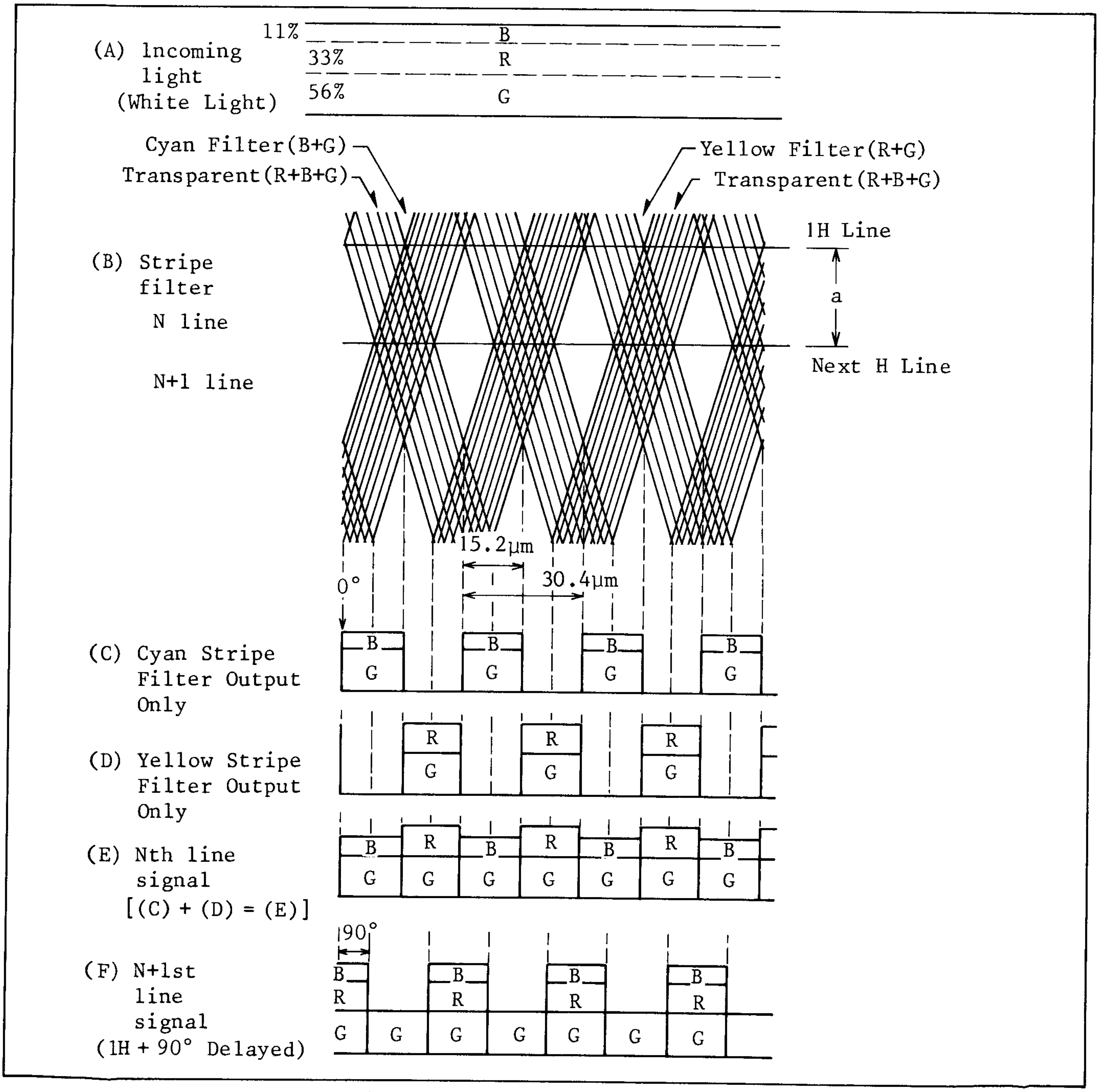

Stripe Filter Area
Newvicon Tube
Faceplate
Active
Scan
V
Optical Black
(Opaque Aluminized Stripe)
H
Active
Scan
Cyan stripe
Yellow
17.00°
17.00°

Fig. 9. Newvicon Faceplate and Stripe Filter

With careful design of size of active scan area or size of stripes, horizontal and vertical, the conditions described in Fig. 11 can be obtained.

COLOR STRIPE FILTER	COLOR PASSED
Transparent (Clear)	Red, Blue and Green
Cyan	Blue and Green
Yellow	Red and Green
Cyan and Yellow	Green

Fig. 10.



(A) Incoming light (White Light)
11%
B
33%
R
56%
G
Cyan Filter(B+G)
Transparent(R+B+G)
Yellow Filter(R+G)
Transparent(R+B+G)
(B) Stripe filter
N line
N+1 line
1H Line
a
Next H Line
15.2μm
30.4μm
0°
(C) Cyan Stripe Filter Output Only
B
G
(D) Yellow Stripe Filter Output Only
R
G
(E) Nth line signal [(C) + (D) = (E)]
(F) N+1st line signal (1H + 90° Delayed)
90°

Fig. 11. Signal from Newvicon

The tube alignment and rotation assure that the horizontal scan exactly bisects the angle formed by the stripes, while vertical scan determines that each horizontal scan falls as shown in Fig. 11-(B). Further more, the width of each stripe and of the horizontal scan determines the characteristic frequency of the process, in this case, 5MHz. As light falls on the stripes, the contrast pattern formed by stripe/no stripe/stripe will optically generate an R.F. carrier above the fundamental luminance information (picture detail). This carrier rides above the luminance.

As shown in Fig. 11-(B), the integral stripe filter consists of a cyan/transparent stripe filter section and a yellow/transparent stripe filter section.
These stripe filters are so arranged as to be of the same pitch in the horizontal scanning direction, and of equal angle in the vertical direction. The pick-up tubes even and odd scanning lines pass the elements of the stripe filters that are arranged in a fixed pattern. Let's assume that a white light of uniform level containing proportioned green (G), red (R) and blue (B) reaches the Newvicon (Fig. 11-(A)), and the cyan and yellow stripe filter is scanned as shown in Fig. 11-(B).
The cyan filter cuts off the R light which is complimentary to cyan (Fig. 11-(C)), and the yellow filter cuts off the B light which is complimentary to yellow (Fig. 11-(D)). At the N scanning line, the signal E contains the modulated R and B signals, and G signal.

At the next horizontal scanning line N + 1, the signal F also contains the modulated R and B signals and G signal. The stripe filters have the same pitch in the horizontal scanning direction and the same angle in the vertical directions so that there is a carrier phase difference of 90° between the N line and the N + 1 line modulated signals. This modulation frequency for the R and B signals can be calculated from stripe width, pitch, and scan width and velocity, in this case, 5MHz.

The incoming light is thus converted by the integrated stripe filter into a signal which contains R and B signals modulated by 5MHz. This signal is sent to the pre-amplifier, where it is amplified (Fig. 12-(G)). The amplified signal G from the preamplifier is sent to a low pass filter circuit, which passes only the luminance (YH) signal (Fig. 12-(H)) making up the G signal. The amplified G signal is also supplied to the high pass filter (HPF) whose frequency is 5MHz, through which only the modulated signal 1 passes. The modulated signal 1 is sent to the 90° phase shift circuit and the 1H (1 line) delay circuit, from which 90° phase-shifted and 1H-delayed, modulated signals J and K are obtained. The modulated R (Rc) signal (L) is obtained by adding the modulated signals (J) and (K), and a modulated B (Bc) signal (N) is obtained by subtracting the modulated signals (J) and (K). The Rc and Bc signals obtained by addition and subtraction are supplied to the detectors, from which R signal (M) and (B) signal (O) are obtained.

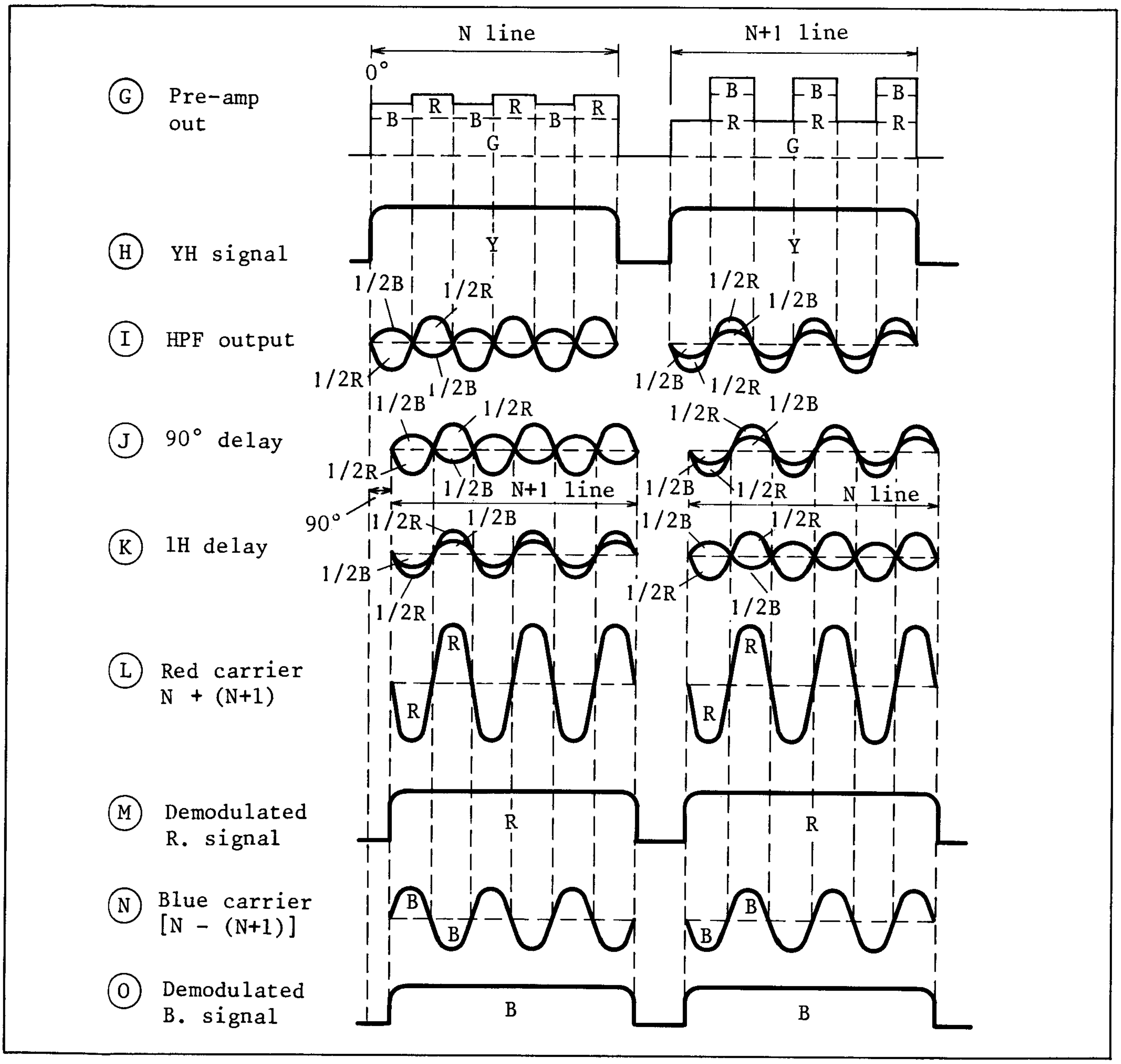

N line
N+1 line
0°
Ⓖ Pre-amp out
B
R
G
Ⓗ YH signal
Y
Ⓘ HPF output
1/2B
1/2R
Ⓙ 90° delay
90°
N+1 line
N line
Ⓚ 1H delay
Ⓛ Red carrier N + (N+1)
R
Ⓜ Demodulated R. signal
Ⓝ Blue carrier [N - (N+1)]
Ⓞ Demodulated B. signal

Fig. 12. Detection of Y,R and B. signals

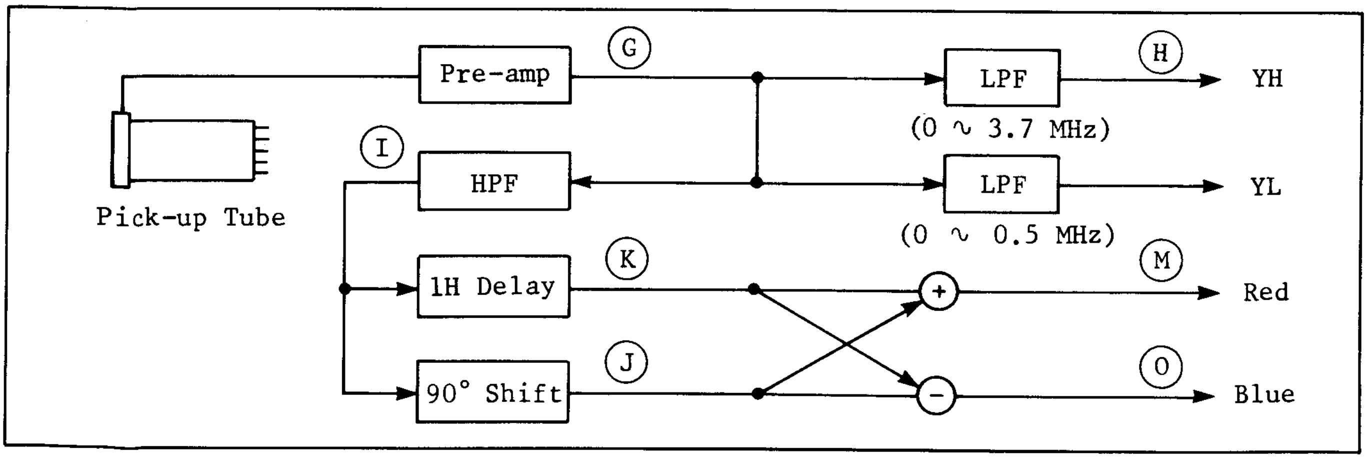

Pick-up Tube
Pre-amp
Ⓖ
LPF
(0 ∿ 3.7 MHz)
Ⓗ
YH
Ⓘ
HPF
LPF
(0 ∿ 0.5 MHz)
YL
1H Delay
Ⓚ
+
Ⓜ
Red
90° Shift
Ⓙ
-
Ⓞ
Blue

Fig. 13.

CORRECTION CIRCUITS

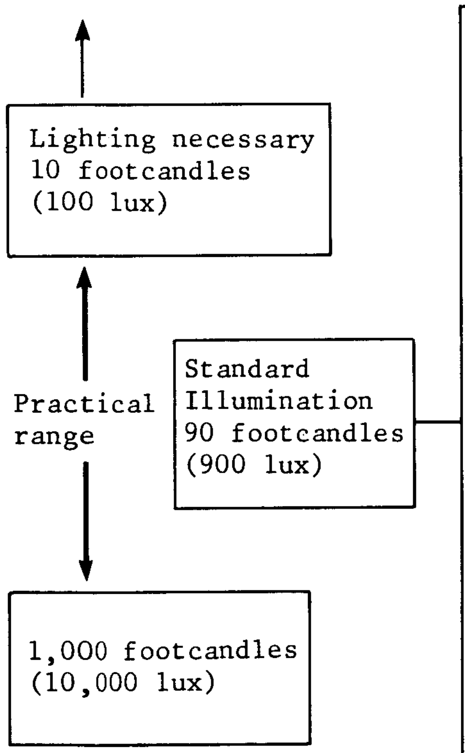
(1) Color Temperature Correction

There are two main aspects we have to consider when we think of light. The first is the brightness or intensity (Fig. 14) and the second is the color temperature.

Light is made up of a spectrum of frequencies or colors, with violet being the lowest frequency and red being the highest (Fig. 15).

Rough Values of Brightness

The figures in this table are approximate values for reference.


Lighting necessary
10 footcandles
(100 lux)
Practical range
Standard Illumination
90 footcandles
(900 lux)
1,000 footcandles
(10,000 lux)

[foot-candle]	[lux]	[Place or Daylight]
10	100	
	100 ∿ 200	Commercial stairways
	200 ∿ 300	Indoor golf range
	400 ∿ 500	Office with fluorescent lamps
	500 ∿ 700	Department store counter
	700 ∿ 800	Assembly line
100	1,000	
	1,000	Sunlight one hour before sunset, clear day
	1,000	Window side of an office with fluorescent lamps
	2,000	Sunlight one hour after sunrise on a cloudy day.
1,000	10,000	
	25,000	Sunlight at 10AM, cloudy day
	32,000	Sunlight at noon, cloudy day
	35,000	Sunlight at 3PM, clear day
	65,000	Sunlight at 10AM, clear day
10,000	100,000	Sunlight at noon, clear day

Fig. 14.

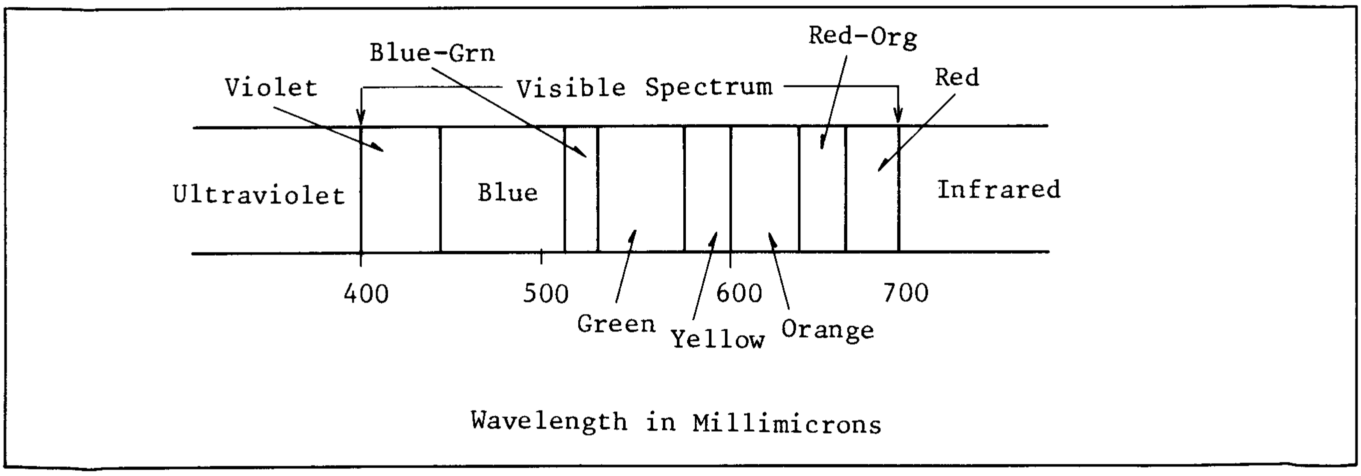

Blue-Grn
Red-Org
Violet
Visible Spectrum
Red
Ultraviolet
Blue
Infrared
400
500
600
700
Green
Yellow
Orange
Wavelength in Millimicrons

Fig. 15.

The human eye has a unique ability to perceive color correctly even when the light source is changed (i.e. when color temperature varies) from pure white to red-white or blue-white. However, machines do not have such ability, and "see" even the slightest color change.
The color mix of what we perceive as white light (Fig. 16) will change.

* Tristimulus Values:
The amount of the three primary colors required to produce white light.

As we move from indoor artificial light to sunlight, objects illuminated by these different light sources will change the proportions of the red and blue signals and the cameras output will appear to be miscolored. Cameras are normally adjusted to 3200° Kelvin Temperature (Fig. 17).

It is for this reason that we have an automatic white balance control switch and color control knob mounted on the back of the camera. With these controls, the proportions of the red and blue signals can be changed to achieve a better white balance. At 3200°K we have a more reddish picture, so less gain is required in the red channel and more in the blue channel. At 5000°K or 5500°K, we have a more blueish picture and less blue gain is needed and more red.

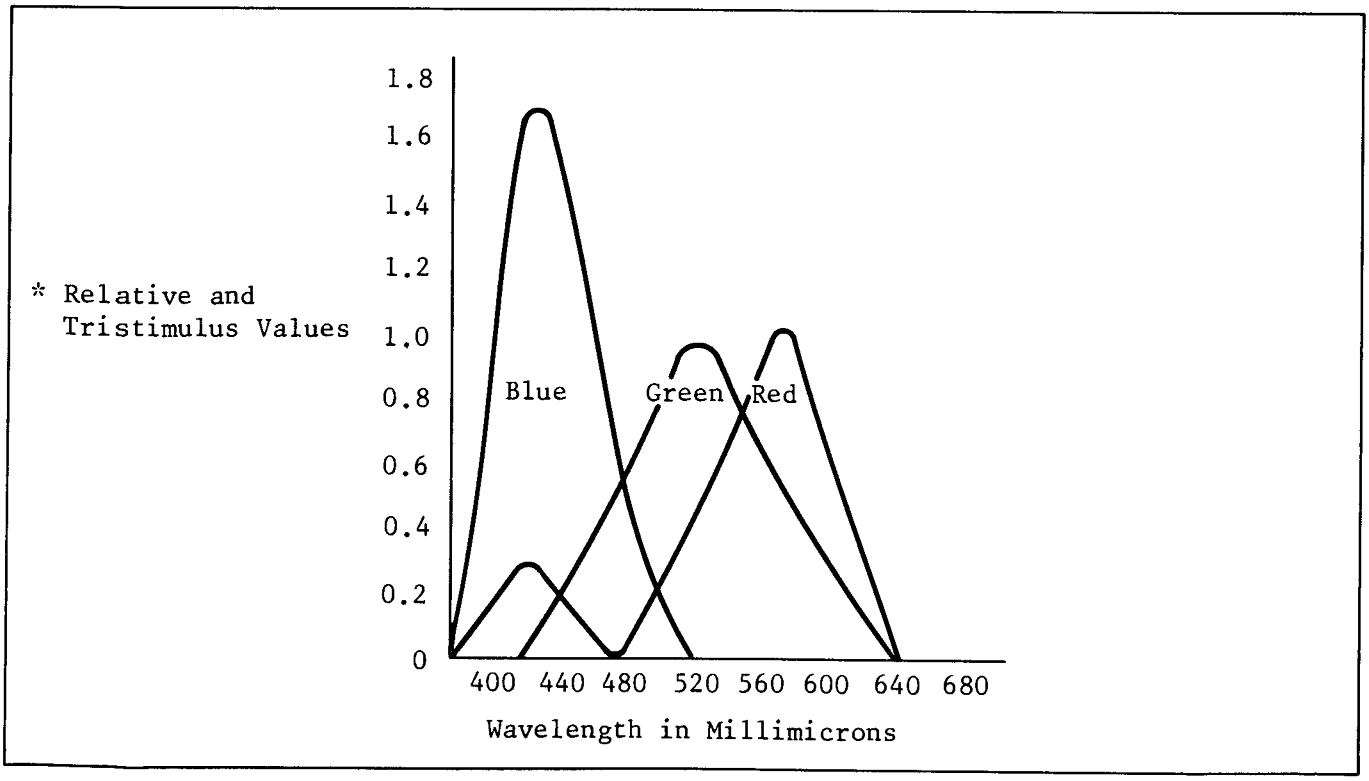


Fig. 16.

Light Source		Filter Switch	Normal Color Correction	Color Temperature
Studio lighting, such as Halogen lamp or tungsten lamp		💡	💡	3200°K
Room light	Incandescent Lamp		💡	4500°K
	Fluorescent	☼	▭	5000°K
Outdoor scene (sunny or overcast)			☁ ☼	5500°K

Fig. 17.

(2) V Edge Color Error Correction

As described, the Rc and Bc signals are separated from each other by addition and subtraction of the Rc/Bc signal delayed one horizontal line and the undelayed Rc/Bc signal. When the camera views a dark-to-bright, or bright-to-dark transition as shown in Fig. 18. the undelayed Rc/Bc signal appears as in Fig. 18-(C), and the Rc/Bc signal delayed one line (1H) appears as in (D). When we make the transition from dark to bright the Rc/Bc (C) and (D) signals are not of equal level on the N + 1 line and an error signal (green) is created along the vertical edge of the transition.

Thus it is necessary for us to supply a positive vertical (V) edge correction signal (E) to control the level of the N + 1 line (F). This provides vertical correlation between Rc/Bc signals delayed and not delayed ((C) and (D)) prior to color separation. If the transition is from bright to dark, the error signal will be magenta and a negative V correction signal will be used. We will discuss this in more detail later.

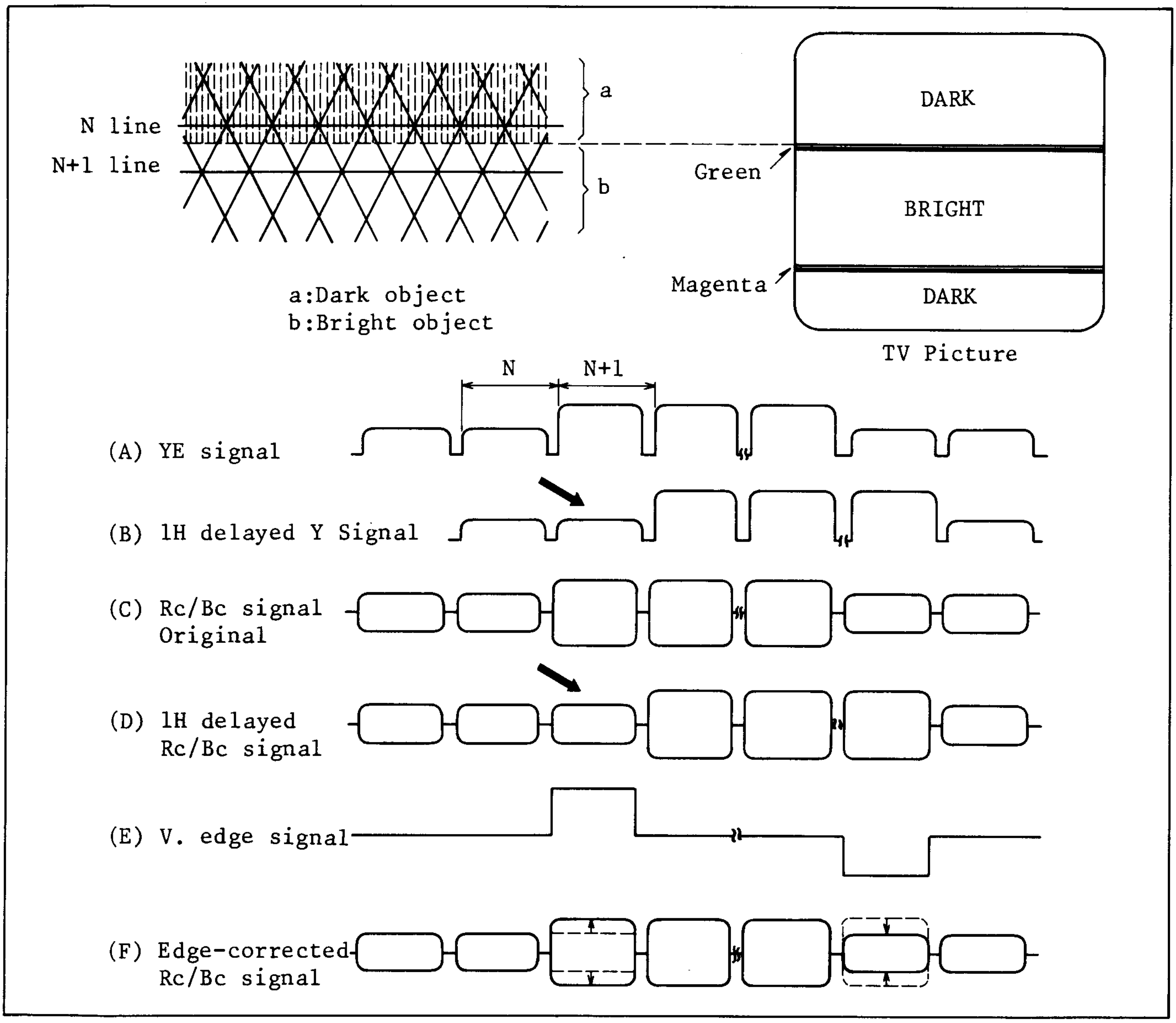

N line
N+1 line
a
b
a:Dark object
b:Bright object
DARK
Green
BRIGHT
Magenta
DARK
TV Picture
N
N+1
(A) YE signal
(B) 1H delayed Y Signal
(C) Rc/Bc signal
Original
(D) 1H delayed
Rc/Bc signal
(E) V. edge signal
(F) Edge-corrected
Rc/Bc signal

Fig. 18. Color Correction

(3) Color Shading Correction

Often the photo conductive layer on the surface of the pick-up tube is uneven. It is necessary to electrically correct for this uneveness. Suppose a uniformly illuminated white object is seen by the camera and the R color component signal has a shading (error) such as that shown in Fig. 19-(A). In this case, a shading correction signal (B) is generated by the shading correction circuit (which is set to the proper level during alignment). The R signal (A) is modulated by the shading correction signal (B), and a corrected R signal (C) is produced. This shading correction signal is mixed with the R signal (C) by a differential amplifier, and the R signal (D) is obtained. The color shading correction of the B signal is similar.

These correction waveforms are horizontal rate sawtooth and parabola waveforms. The two signal are formed from the horizontal deflection drive and injected in just the right amount to get an overall flat color waveform.

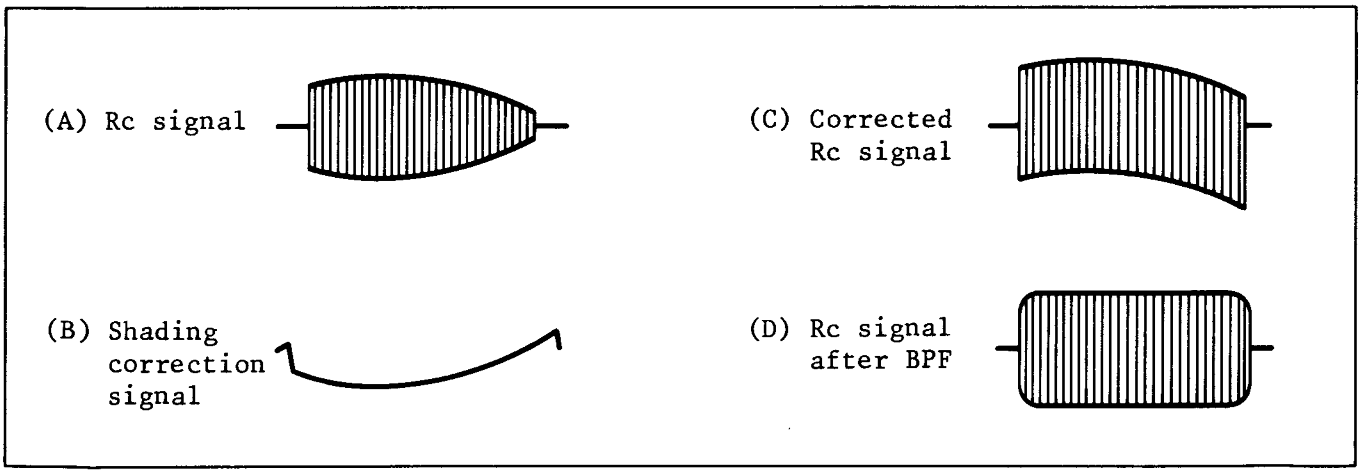
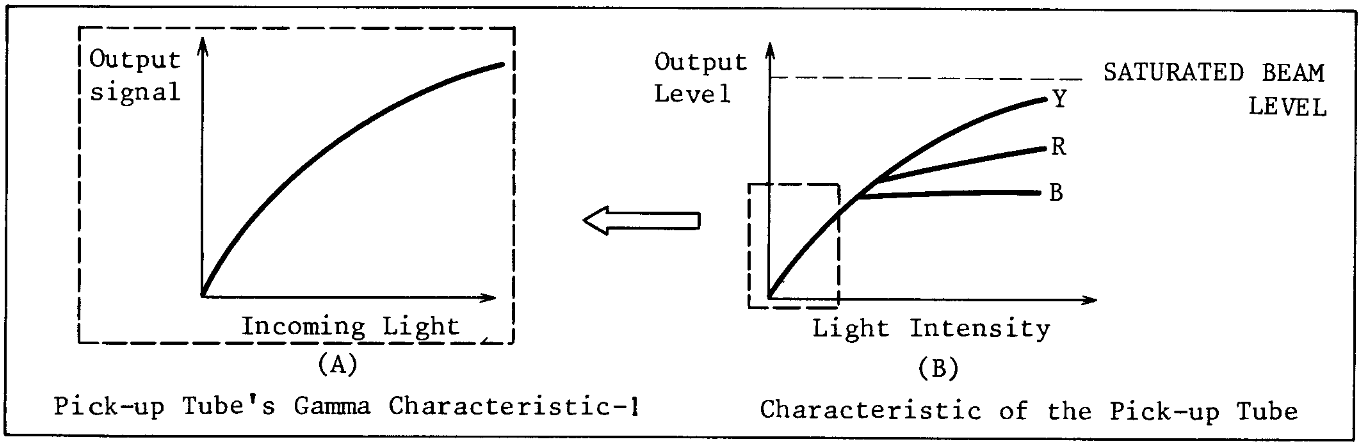


Fig. 19. Shading Correction

(4) De-Gamma Correction Circuit

As described earlier, the pick-up tube does not have linear photoelectric conversion characteristics. A typical pick-up tube gamma characteristic is shown in Fig. 20-(A). Because of this inherent characteristic, the higher levels of the video signal will be compressed, see Fig. 20-(B).

Since the pick-up tube in this color camera produces 5MHz modulated red (R) and blue (B) signals mixed with a green (G) signal (see Fig. 21-(A)), the higher levels of the modulated R and B signals obtained by separating the mixed signals are also compressed (B). The de-gamma correction signal circuit generates a de-gamma correction signal (D) to compensate for the compression of the higher levels of the R and B signals. This correction signal will be applied to both the Rc and Bc circuits as needed.



(A) Pick-up Tube's Gamma Characteristic-1

(B) Characteristic of the Pick-up Tube

Fig. 20.

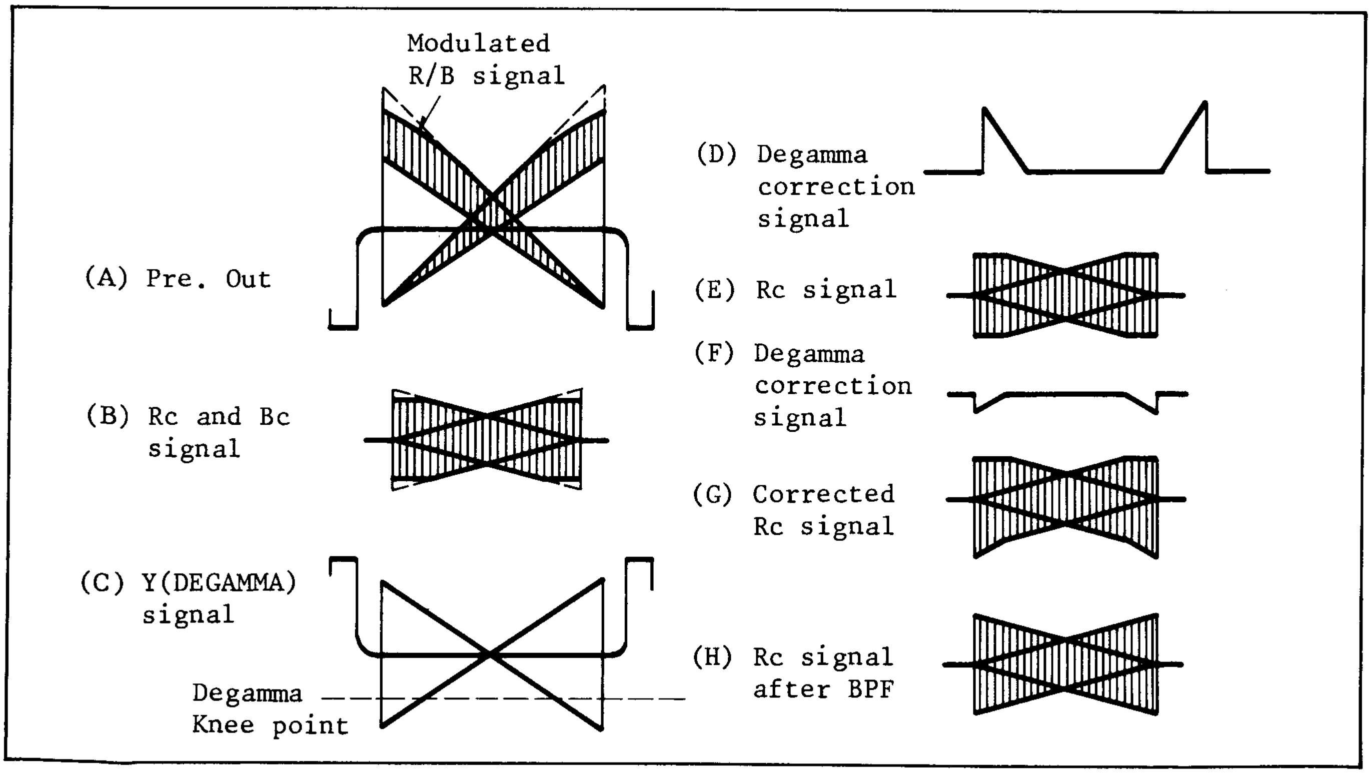

Modulated R/B signal
(A) Pre. Out
(B) Rc and Bc signal
(C) Y(DEGAMMA) signal
Degamma Knee point
(D) Degamma correction signal
(E) Rc signal
(F) Degamma correction signal
(G) Corrected Rc signal
(H) Rc signal after BPF

Fig. 21. Degamma Correction Signal

(5) Optical Black Clamp

A metallic stripe (optical black) (Fig. 22) is built into the pick-up tube for cutting off the incoming light at the end of the horizontal scanning. When the beam scans the optical black portion, the dark current of the pick-up tube is sampled and is clamped to a fixed DC potential, so that the black level variations due to a change in dark current can be tracked.

(6) High Luminance Chroma Clip Circuit

When the incoming light is extremely bright, the luminance level increases in direct proportion to the incoming light, therefore, the modulated chroma signal from the pick-up tube is lowered in the inverse proportion to the incoming light until it finally disappears, resulting in a greenish picture on the TV screen and loss of white balance.

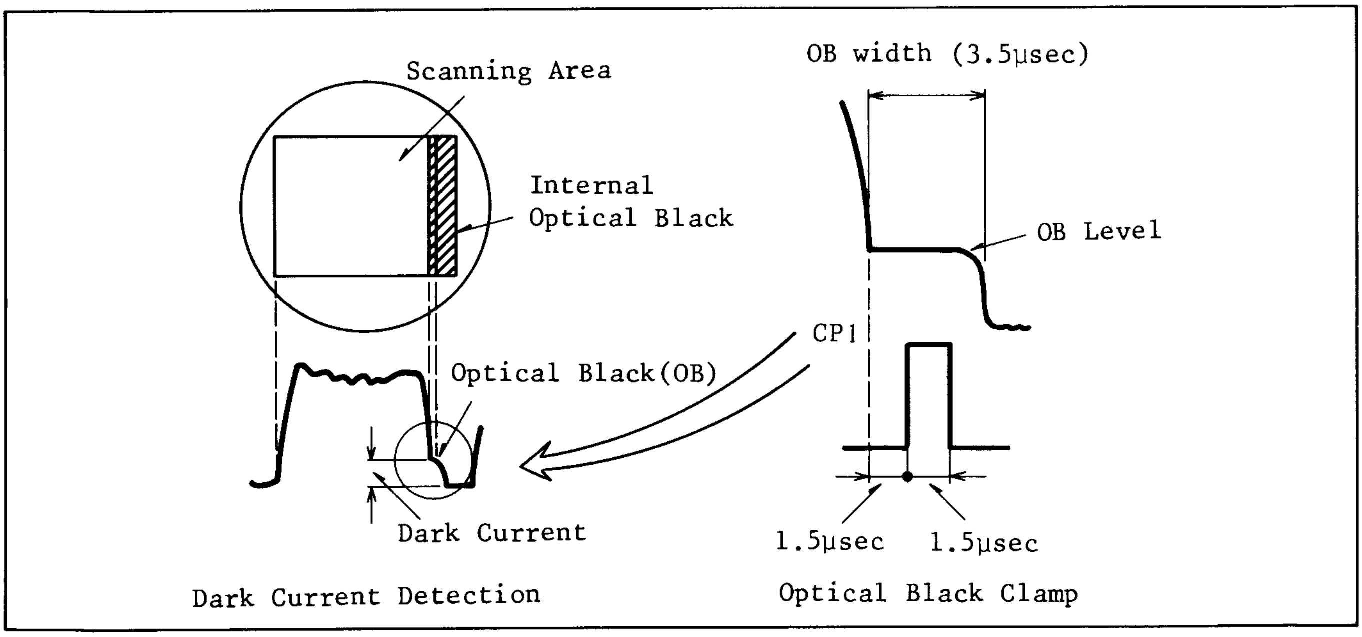

Scanning Area
Internal
Optical Black
Optical Black(OB)
Dark Current
Dark Current Detection
OB width (3.5µsec)
OB Level
CP1
1.5µsec
1.5µsec
Optical Black Clamp

Fig. 22.

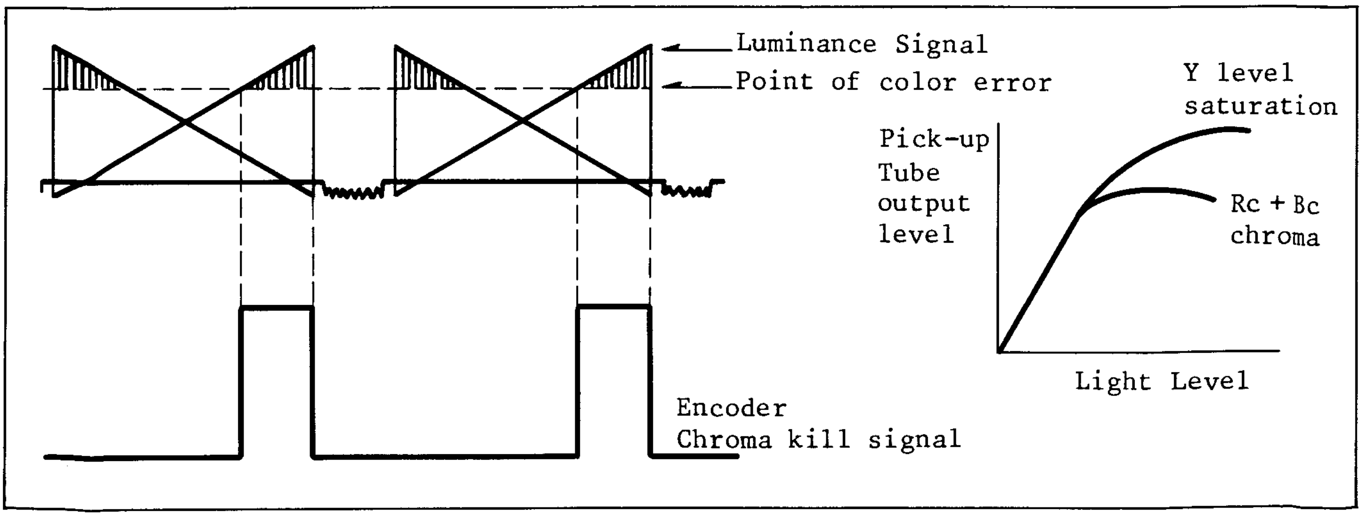

Luminance Signal
Point of color error
Encoder
Chroma kill signal
Y level
saturation
Pick-up
Tube
output
level
Rc + Bc
chroma
Light Level

Fig. 23.

Therefore, a signal must be sent to the encoder to turn off the NTSC chroma modulators at peak whites. Since the chroma information in the NTSC signal is difference information, the lack of chroma makes the peak signal appear white, rather than miscolored (greenish picture).

(7) Horizontal Aperture Correction

The electronic beam has some thickness, so that when the electronic beam scans the pick-up tube face or CRT, it causes some loss of resolution.
To enhance the horizontal resolution, a correction circuit generates a horizontal aperture correction signal.

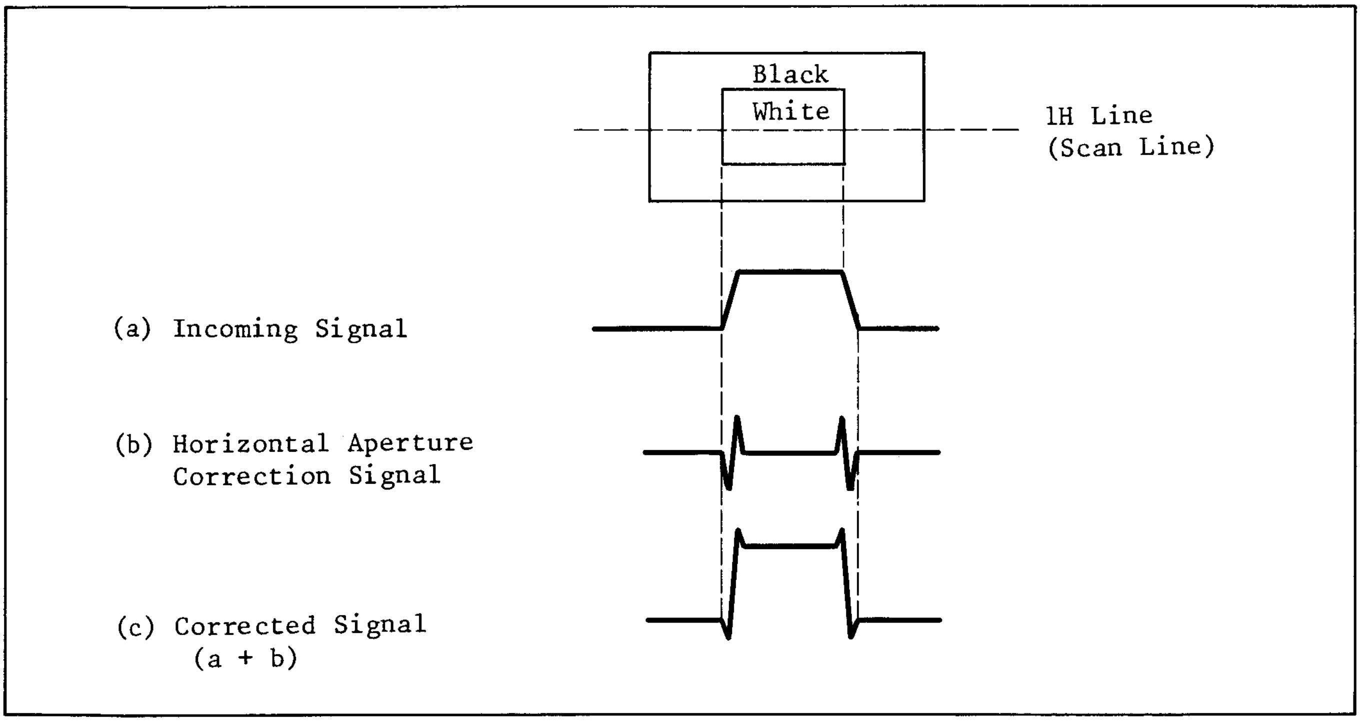

Black
White
1H Line
(Scan Line)
(a) Incoming Signal
(b) Horizontal Aperture Correction Signal
(c) Corrected Signal (a + b)

Fig. 24. Horizontal Aperture Correction

(8) Overall Block Diagram and Description

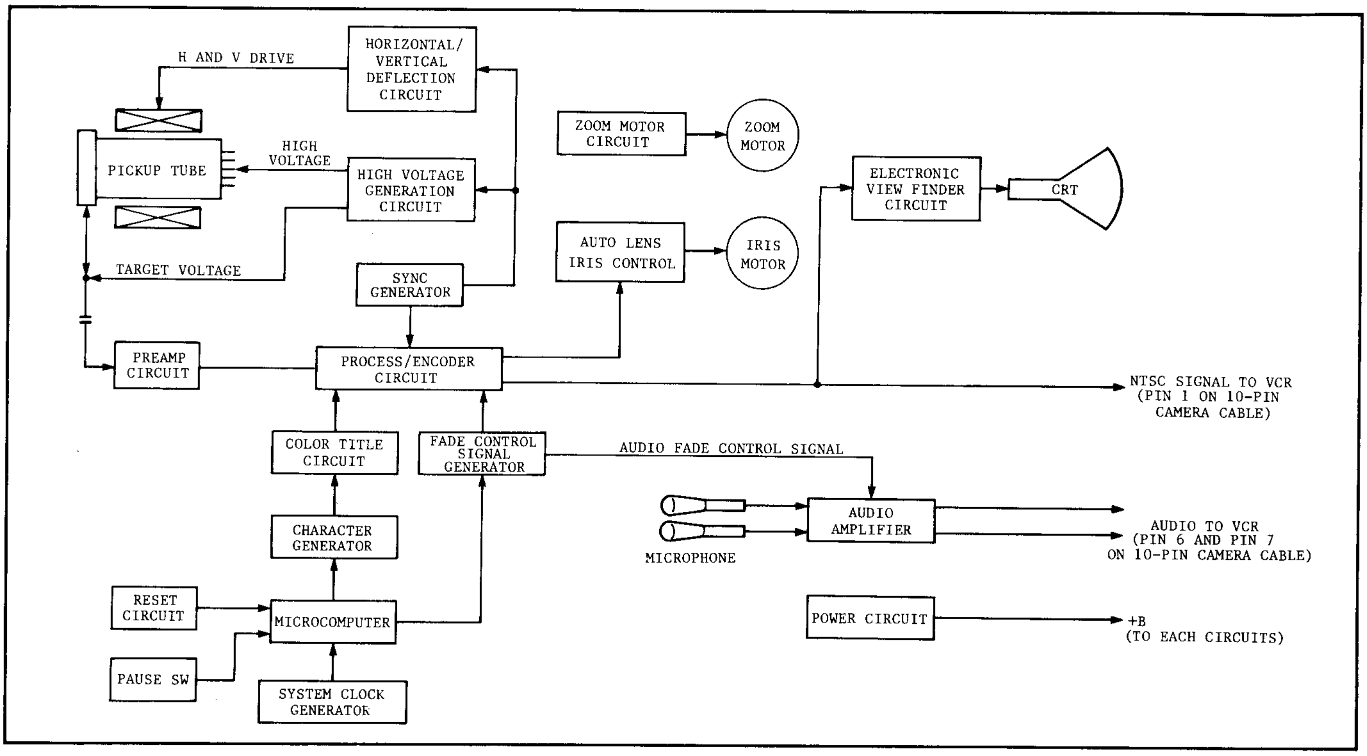

H AND V DRIVE
HORIZONTAL/ VERTICAL DEFLECTION CIRCUIT
PICKUP TUBE
HIGH VOLTAGE
HIGH VOLTAGE GENERATION CIRCUIT
TARGET VOLTAGE
SYNC GENERATOR
ZOOM MOTOR CIRCUIT
ZOOM MOTOR
AUTO LENS IRIS CONTROL
IRIS MOTOR
ELECTRONIC VIEW FINDER CIRCUIT
CRT
PREAMP CIRCUIT
PROCESS/ENCODER CIRCUIT
NTSC SIGNAL TO VCR (PIN 1 ON 10-PIN CAMERA CABLE)
COLOR TITLE CIRCUIT
FADE CONTROL SIGNAL GENERATOR
AUDIO FADE CONTROL SIGNAL
CHARACTER GENERATOR
AUDIO AMPLIFIER
MICROPHONE
AUDIO TO VCR (PIN 6 AND PIN 7 ON 10-PIN CAMERA CABLE)
RESET CIRCUIT
MICROCOMPUTER
POWER CIRCUIT
+B (TO EACH CIRCUITS)
PAUSE SW
SYSTEM CLOCK GENERATOR

Fig. 25. Simplified Overall Block Diagram

Let's look at the simplified overall block diagram in Fig. 25. The Newvicon tube S4165 is supplied with not only high voltage for tube elements, but also with horizontal and vertical drives for the deflection coils wrapped around the pick-up tube. The pick-up tube is also supplied with a target voltage through the pre-amp. The output of pick-up tube is amplifier (80dB) and maintained a good S/N ratio by the pre-amplifier circuit.

The signal is now sent to the process and encoder circuits for the video to be amplified and to separate the luminance from the red and blue carriers. It is also gamma and de-gamma corrected, V edge-corrected, color shading corrected and also temperature-corrected. The signal is also sent through a matrix to produce R-Y and B-Y components. The R-Y and B-Y signals are modulated with red and blue carriers. The signal is further clipped and finally sent to an AGC circuit and out to the EVF and NTSC output.

The process and encoder circuits also drive the automatic iris. The sync generator supplies the process and encoder circuits with the necessary drives and carriers.

The camera can be powered by the VCR or with an AC power supply.

Panasonic®

MATSUSHITA ELECTRIC

Printed in Japan

ORDER NO. VRD-8303-372

Service Manual

Color Video Camera

PK-957

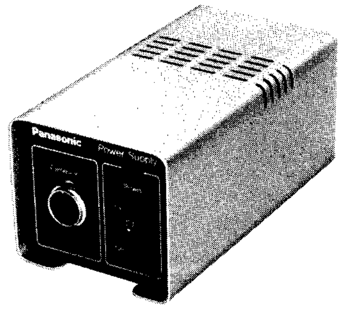
Power Supply Unit

PK-A789S

Vol. 2

Adjustment Procedures

PK-957



PK-A789S

SPECIFICATIONS:

Power Source:	DC 12 V ± 10% AC 120 V ± 10%, 60 Hz ± 0.5% (with Power Supply Unit)
Power Consumption: (with E.V.F)	DC 6.6 W at 12 V DC (Battery) DC 2.0 W at standby
Newvicon Tube System:	2/3″ frequency separation single tube system (built-in stripe filter)
Single Carrier Frequency:	5 MHz
Focus System:	Electro-static type
Lens Mounting:	Built-in zoom lens (not "C" mount)
Lens:	8 : 1 zoom lens with auto/manual iris control. Auto zoom lens and macro construction F: 1.6, f: 12—96 mm d: 1.2 m to infinity
Lens Diameter:	58 mm
Light Sensitivity:	Minimum light intensity on optical image: 10 Lux (F: 1.4) Optimum light intensity on optical image: 900 Lux
Video Output Level:	1.0 Vp-p, 75Ω (M type coaxial connector) (Standard NTSC signal)
Sync. System:	Internal Sync.: RS-170
Signal to Noise Ratio:	More than 45 dB
Horizontal Resolution:	300 lines

Color Temperature Control:	2 step switch (indoor/outdoor) & auto adjust
Microphone:	Built-in stereo microphone
Audio Output Level:	−20 dB, Hi-impedance
Audio Output Impedance:	High impedance (1 KΩ)
External Microphone Input Impedance: (Left, Right)	600Ω unbalanced
Electronic Viewfinder:	Monochrome 1 inch CRT
Operating Temperature:	5°C to 40°C
Operating Humidity:	10% to 75%
Operating Position:	Normal position only
Weight:	Camera Head with E.V.F. 5.5 lbs (with lens, 7 ft cable & shoulder pad/handle grip) AC adaptor (option) 2.4 lbs
Dimensions:	Camera Head with E.V.F. 8.3″(W) × 8.7″(H) × 11.8″(D) 208 mm(W) × 218 mm(H) × 296 mm(D) AC adaptor (option) 3″(W) × 3″(H) × 6″(D) 79 mm(W) × 75 mm(H) × 149 mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

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PRODUCT COMPLIES WITH DHHS RULES 21CFR SUBCHARTER J APPLICABLE AT DATE OF MANUFACTURE

SAFETY PRECAUTION

GENERAL GUIDELINES

1. When service is required, observe the original lead dress. Components, wires or cables that indicate evidence of overheating or other electrical or mechanical damage should be replaced.
2. After servicing the camera, power supply and electronic viewfinder, all the protective devices, such as insulation tape, shields and isolation R-C combinations must be properly installed.
3. Potentials as high as 5KV are present when the electronic viewfinder is operating. Operation without the camera head side covers, finder case ass'ys of electronic viewfinder and covers of power supply unit presents a danger of shock hazard from the camera power supply. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions that should be taken when working on high-voltage equipment. Always discharge the anode of the picture tube to the main chassis before handling the tube.
4. After servicing , make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

Conduct this test on the power supply unit with the camera disconnected and repeat with the camera, power supply unit and electronic viewfinder properly assembled. Also, repeat test with and without available approved accessories/cables/connectors.

1. Turn the AC switch on.
2. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed terminal, screwheads and coaxial connectror. The resistance measured should not be less than ∞ (infinity). Any resistance value below this range indicates an abnormality which requires corrective action.
3. Repeat the test with the AC switch in the "off" position.

LEAKAGE CURRENT HOT CHECK

Conduct this test on the power supply unit with the camera disconnected and repeat with the camera, power supply unit and electronic viewfinder properly assembled. Also, repeat test with and without available approved accessories/cables/connectors.

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a 1.5KΩ 10 watt resistor, paralleled by 0.15μF capacitor, between each exposed metallic part on the unit and a good earth ground such as a water pipe, as shown in figure 1.
3. Use an AC voltmeter, with 1000Ω/volt or more sensitivity, to measure the potential across the resistor.
4. Check all exposed metallic parts of the cover (Cable connection, Handle bracket, metallic cabinet, Screwheads, Metallic overlays, etc), and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 V RMS. A leakage current tester (FLUKE MODEL: 8000A equivalent) may be used to make the hot checks. Leakage current must not exceed 0.5 milliamp. In case a measurement is out side of the limits specified, there is a possibility of a shock hazard, and corrective action must be taken before returning the instrument to the customer.

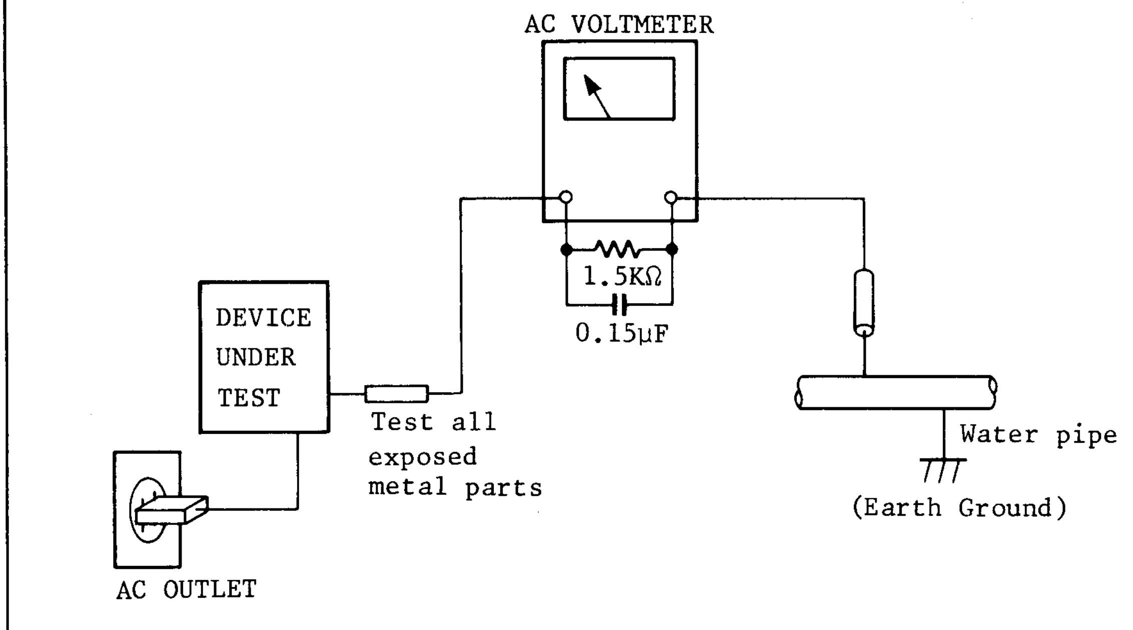

Figure 1. Leakage Current Hot Check

X - RADIATION

1. The potential source of x-radiation in electronic viewfinder is the high-voltage section and picture tube.
2. It is important to use a periodically checked and accurate high-voltage meter, to monitor and check the high voltage.
   Rotate the brightness control and contrast fully counterclockwise for this test.
3. Observe that the high voltage does not exceed the specified value.
   Excessive high voltage may cause a possible x-radiation hazard.
   The camera system should be repaired as soon as possible.
4. It is essential to use the specified picture tube to avoid a possible x-radiation hazard.

CONTENTS

ADJUSTMENT PROCEDURES 2-2
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  (2) Deflection Circuit Adjustment 2-12
  (3) Process Circuit Adjustment 2-30
  (4) Electronic Viewfinder Circuit Adjustment 2-41
  (5) Camera Remote Control Circuit 2-41
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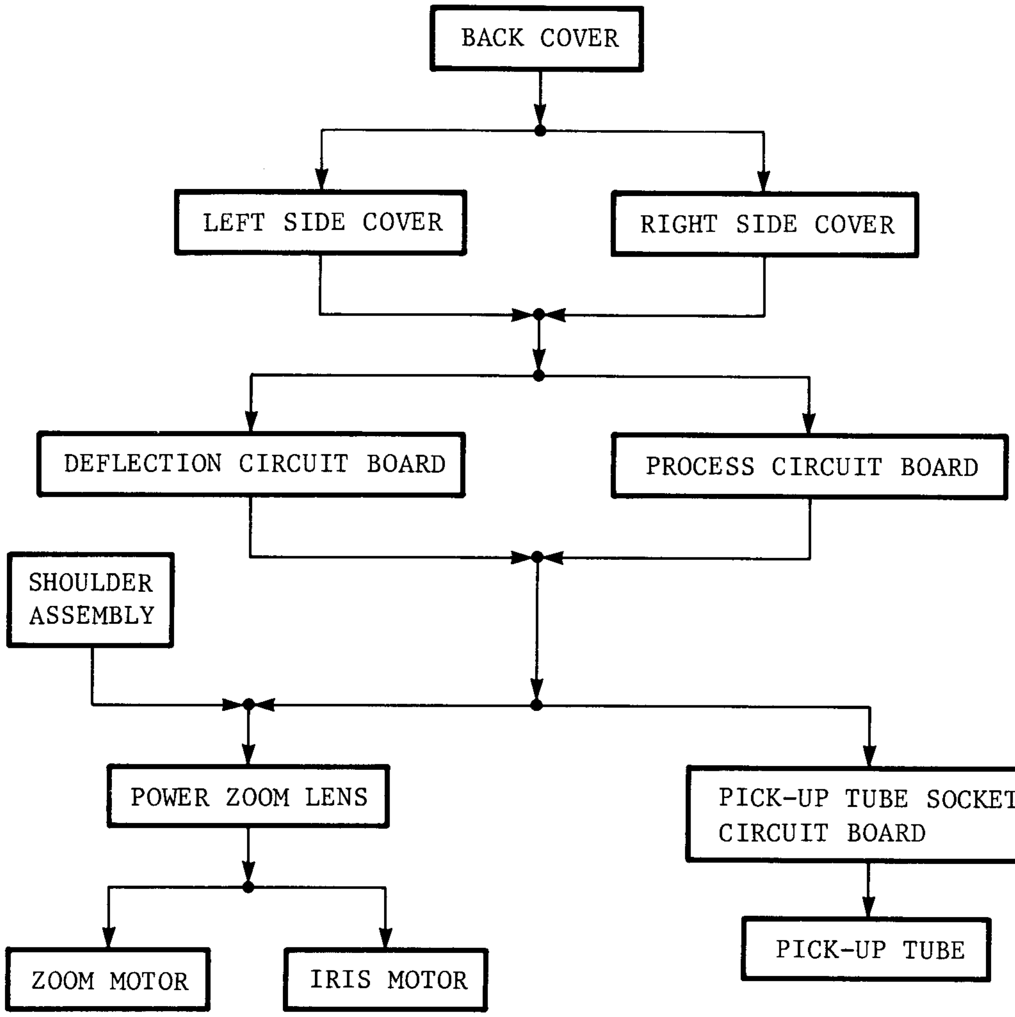
ADJUSTMENT PROCEDURES

Disassembly Method

Caution : Camera Service must be performed in a dust free location to maintain clean lens elements.

1. DISASSEMBLY FLOW CHART


BACK COVER
LEFT SIDE COVER
RIGHT SIDE COVER
DEFLECTION CIRCUIT BOARD
PROCESS CIRCUIT BOARD
SHOULDER ASSEMBLY
POWER ZOOM LENS
PICK-UP TUBE SOCKET CIRCUIT BOARD
ZOOM MOTOR
IRIS MOTOR
PICK-UP TUBE

2. DETAILED DISASSEMBLY METHOD

2-1. Removal of EVF Unit
Turn the handle knob (A), then, pull out the EVF cord and remove the EVF unit (see Fig. 1).

Note: "Left side" and "right side" designations refer to the left and right sides of the camera when viewed from the front (lens end).

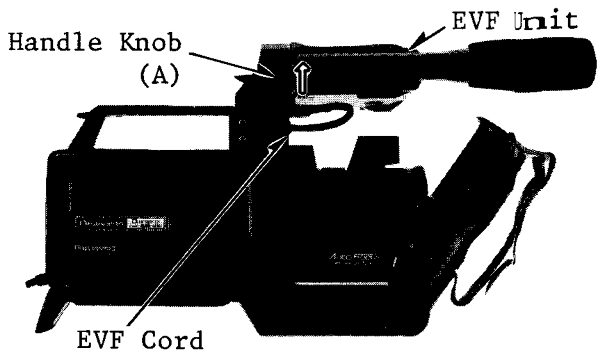
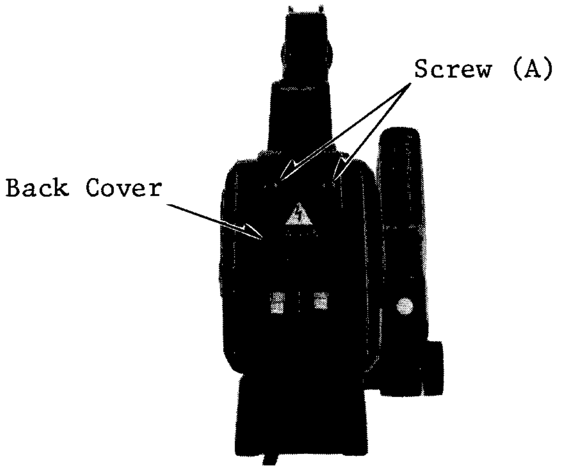

Handle Knob
(A)
EVF Unit
EVF Cord

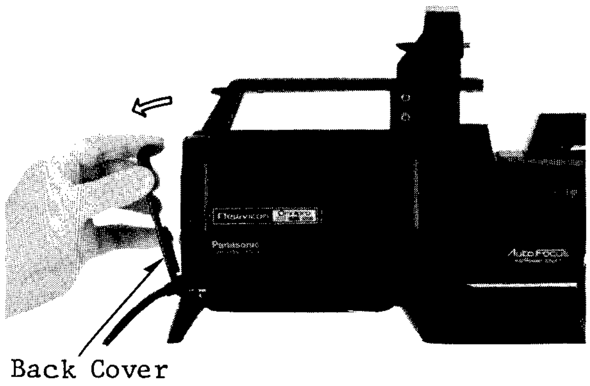
Fig. 1 Left Side View

2-2. Removal of Back Cover

Unscrew 2 screws (A) and remove the back cover (see Fig. 2).


Screw (A)
Back Cover

(A) Rear View



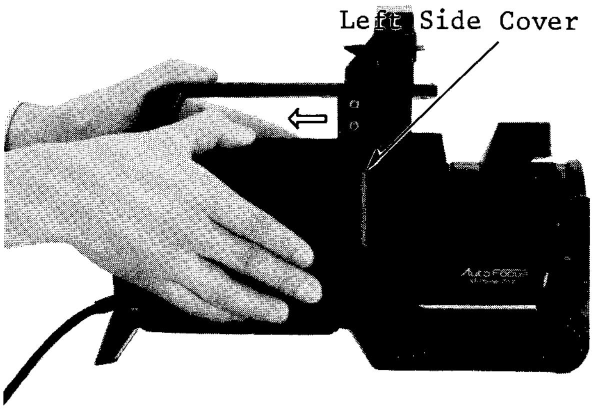
(B) Left Side View

Fig. 2

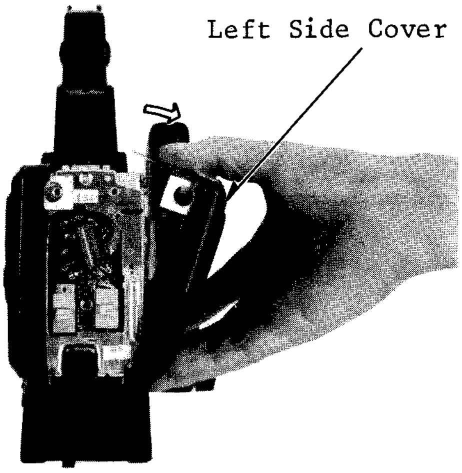
2-3. Removal of Left Side Cover

a. Move the left side cover to the rear (see Fig. 3-A).

b. Then, remove the left side cover (see Fig. 3-B).


Left Side Cover

(A) Left Side View


Left Side Cover

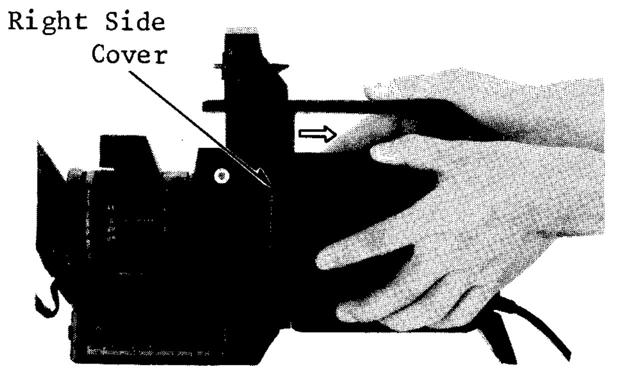
(B) Rear View

Fig. 3

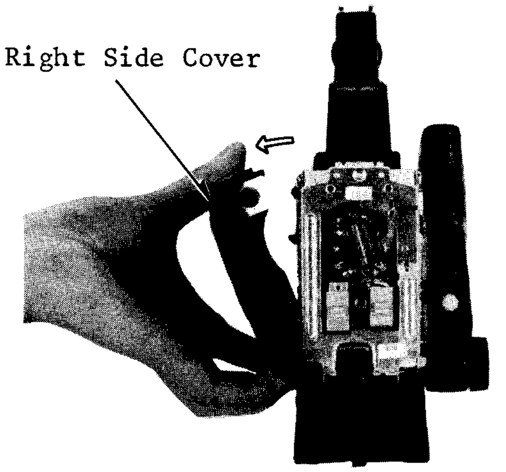
2-4. Removal of Right Side Cover

a. Move the right side cover to the rear (see Fig. 4-A).

b. Then, remove the right side cover (see Fig. 4-B).


Right Side Cover

(A) Right Side View


Right Side Cover

(B) Rear View

Fig. 4

2-5. Opening of Deflection Circuit Board
Unscrew 2 screws (B) securing the circuit board to the chassis (see Fig. 5).

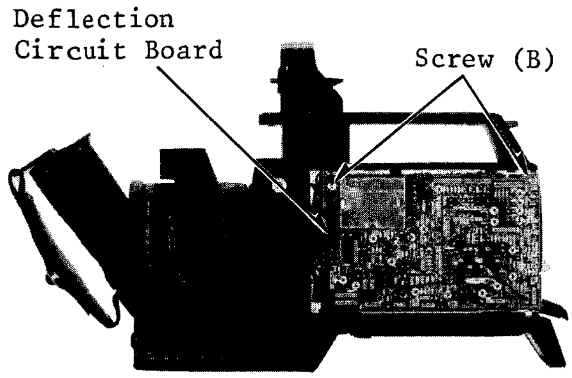

Deflection Circuit Board
Screw (B)

Fig. 5 Right Side View

2-6. Opening of Process Circuit Board
Unscrew 2 screws (C) securing the circuit board to the chassis (see Fig. 6).

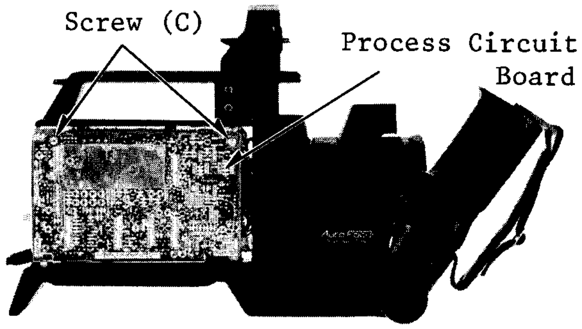

Screw (C)
Process Circuit Board

Fig. 6 Left Side View

3. REPLACEMENT OF THE PICK-UP TUBE

3-1. Remove both side covers and open the process circuit and deflection circuit boards (refer to section "Disassembly Method").

3-2. Disconnect a connector (P602) (see Fig. 7).

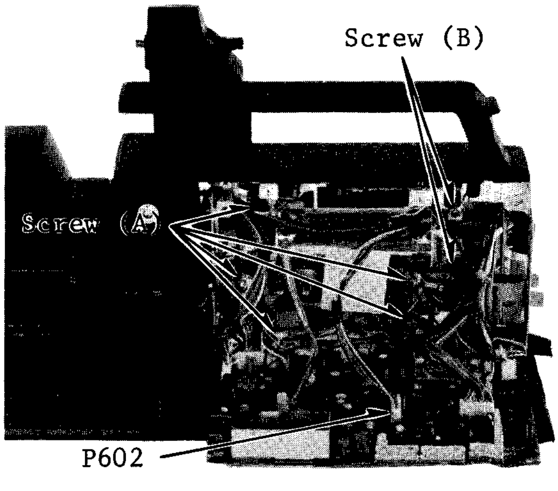

Screw (B)
Screw (A)
P602

Fig. 7 Right Side View

3-3. Unscrew 5 screws (A) and 2 screws (B) (see Fig. 7).

3-4. Unsolder and remove 2 ground leads and the preamp. shield cover (see Fig. 8).

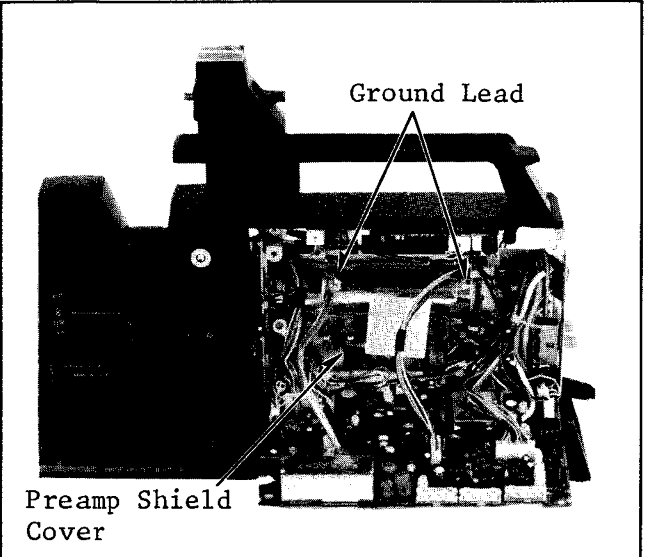

Ground Lead
Preamp Shield Cover

Fig. 8 Right Side View

3-5. Unsolder and remove a white lead from the preamp. circuit board (see Fig. 9).

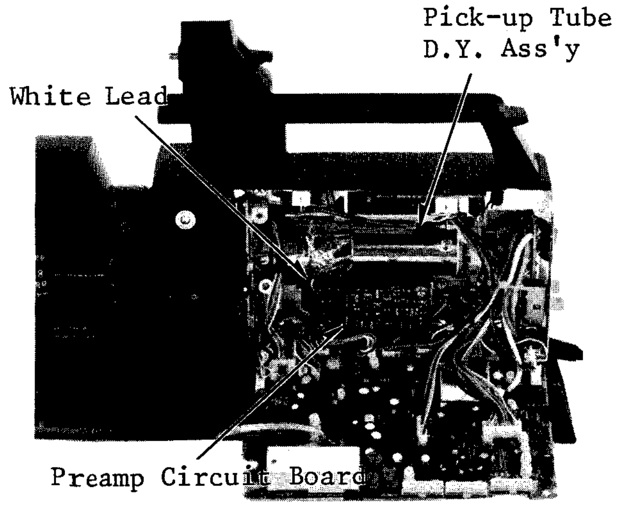

Pick-up Tube D.Y. Ass'y
White Lead
Preamp Circuit Board

Fig. 9 Right Side View

3-6. Remove the pick-up tube socket circuit board and the bias light LED from the pick-up tube (see Fig. 10).

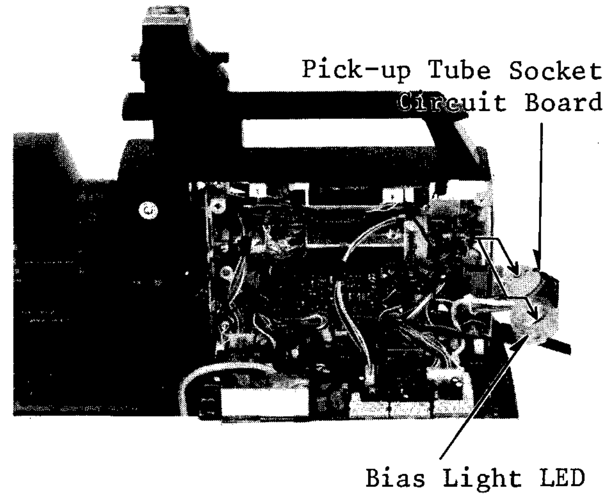

Pick-up Tube Socket Circuit Board
Bias Light LED

Fig. 10

3-7. Remove the pick-up tube D.Y. assembly with the filter fixture assembly (see Fig. 11).

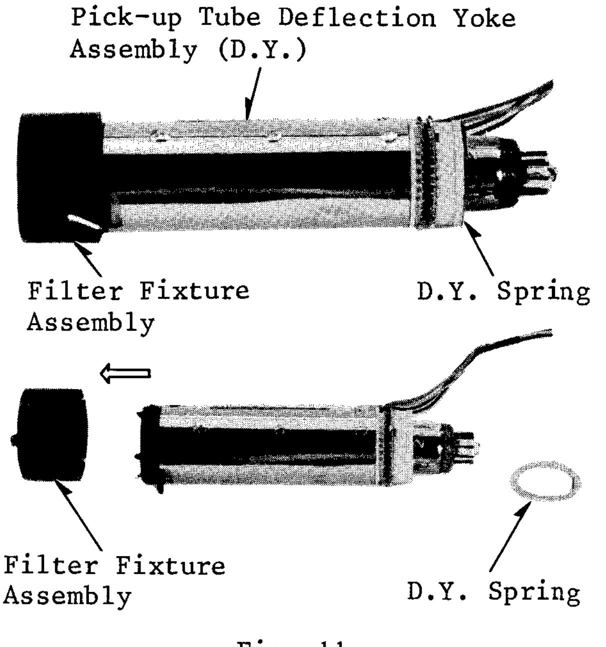

Pick-up Tube Deflection Yoke Assembly (D.Y.)
Filter Fixture Assembly
D.Y. Spring
Filter Fixture Assembly
D.Y. Spring

Fig. 11

3-8. Remove the filter fixture assembly and the D.Y. spring from the pick-up tube D.Y. assembly (see Fig. 11).

3-9. Loosen the clamp screw and remove the pick-up tube from the deflection yoke assembly (D.Y.) (see Fig. 12).

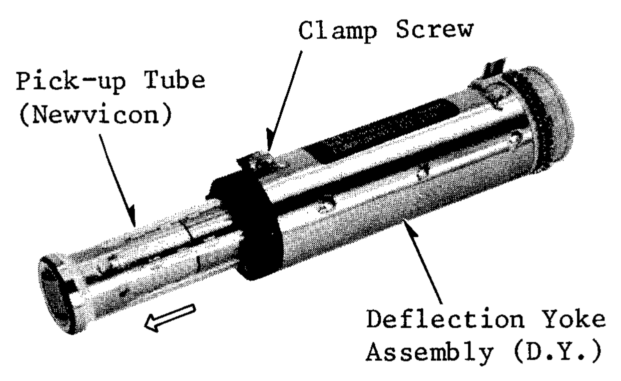

Clamp Screw
Pick-up Tube
(Newvicon)
Deflection Yoke
Assembly (D.Y.)

Fig. 12 Pick-up Tube and D.Y.

3-10. Install the new pick-up tube (S4131) in the deflection yoke assembly as shown in Fig. 13.

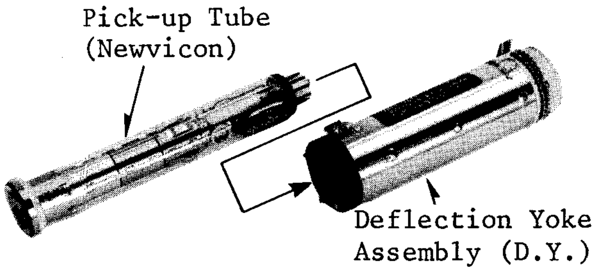

Pick-up Tube
(Newvicon)
Deflection Yoke
Assembly (D.Y.)

Fig. 13 Pick-up Tube and D.Y.

3-11. Line up the plastic tab on the D.Y. assembly with the silver line on the face of the pick-up tube as shown in Fig. 14.

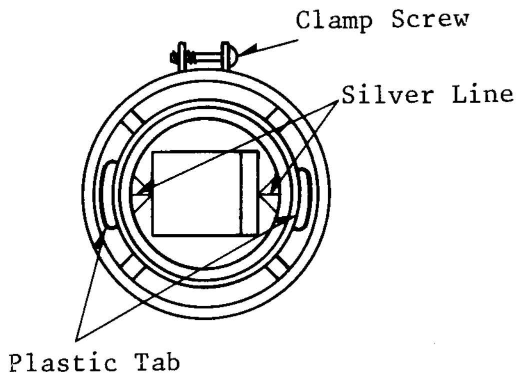

Clamp Screw
Silver Line
Plastic Tab

Fig. 14

3-12. Push the pick-up tube in the D.Y. assembly as far as it will go ... using lens cleaning tissue paper to keep the face plate spotless (see Fig. 15).

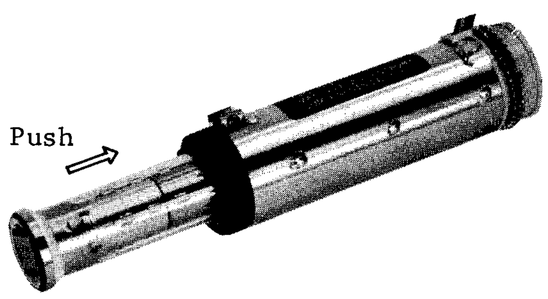


Fig. 15

3-13. Reverse the previous steps.

4. REPLACEMENT OF THE POWER ZOOM LENS

4-1. Remove the both side covers (refer to section "Disassembly Method").

4-2. Remove the shoulder assembly. Unscrew 3 screws (A) and remove the shoulder assembly from the camera head (see Fig. 16).

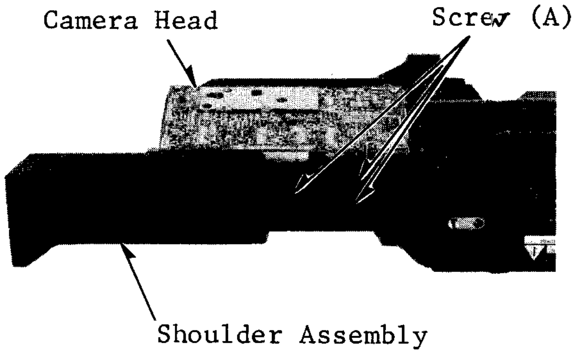
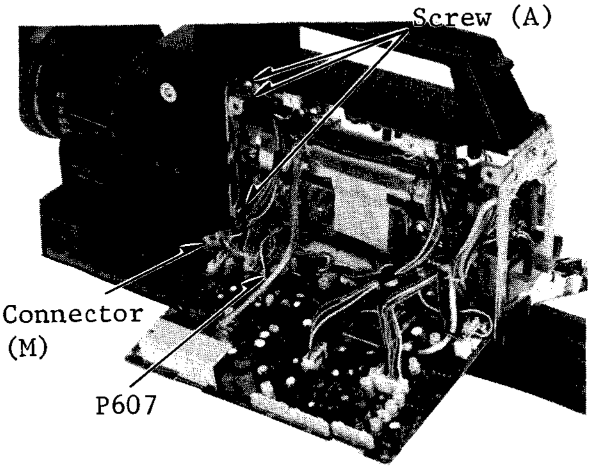

Camera Head
Screw (A)
Shoulder Assembly

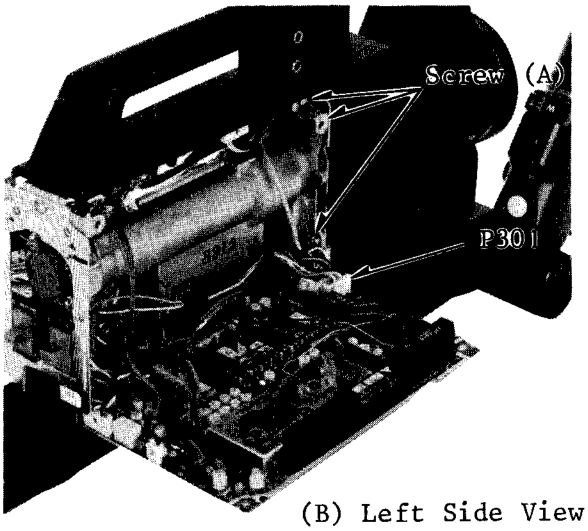
Fig. 16 Bottom Side View

4-3. Open the process circuit and the deflection circuit boards (refer to section "Disassembly Method").

4-4. Disconnect 3 connectors (connector (M), P607, P301) (see Fig. 17-A/B).


Screw (A)
Connector (M)
P607

(A) Right Side View


Screw (A)
P301

(B) Left Side View

Fig. 17

4-5. Unscrew 6 screws (A) and remove the lens assembly (see Fig. 18).

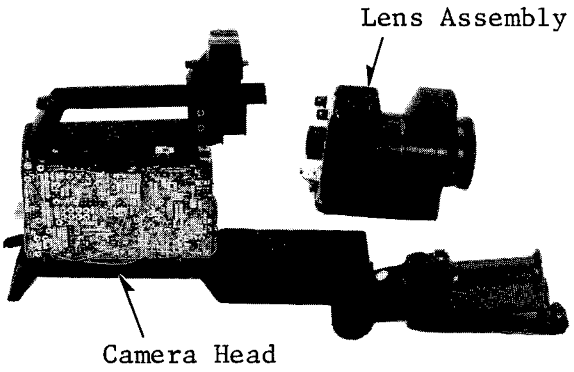

Lens Assembly
Camera Head

Fig. 18

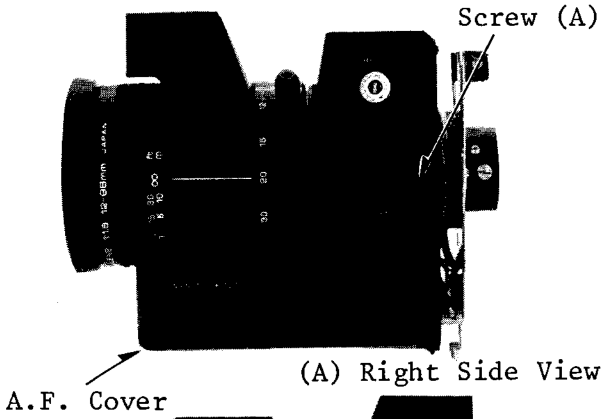
4-6. Install the new zoom lens ... using lens cleaning tissue paper to keep the lens spotless.

4-7. Reverse the previous steps.

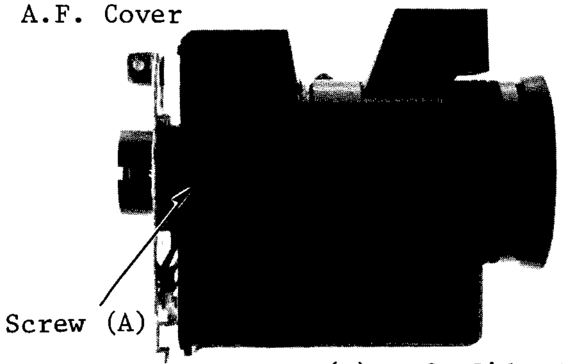
5. REPLACEMENT OF ZOOM MOTOR (VEKW0645)

5-1. Remove the lens assembly (refer to section "Replacement of the power zoom lens").

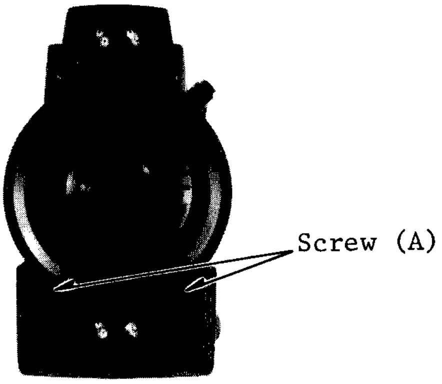
5-2. Unscrew 4 screws (A) and remove the A.F. Cover (see Fig. 19-A/B/C/D).


Screw (A)
A.F. Cover

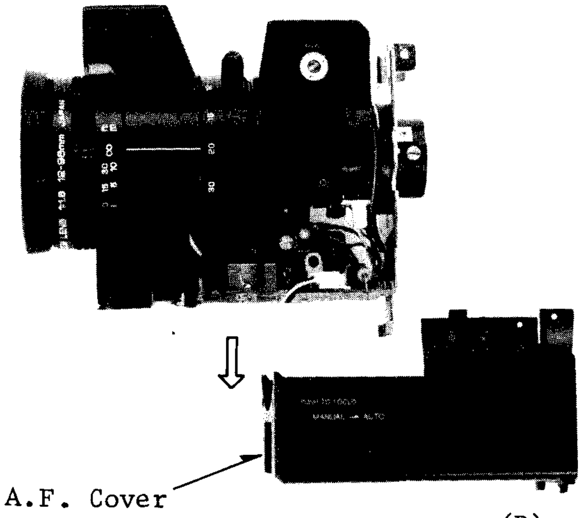
(A) Right Side View



(B) Left Side View



(C) Front View



(D)

Fig. 19

5-3. Unscrew 6 screws (B) and loosen the hex screw and unscrew the relay lens slide screw (C).

5-4. Then, remove the chassis. (see Fig. 20-A/B/C).

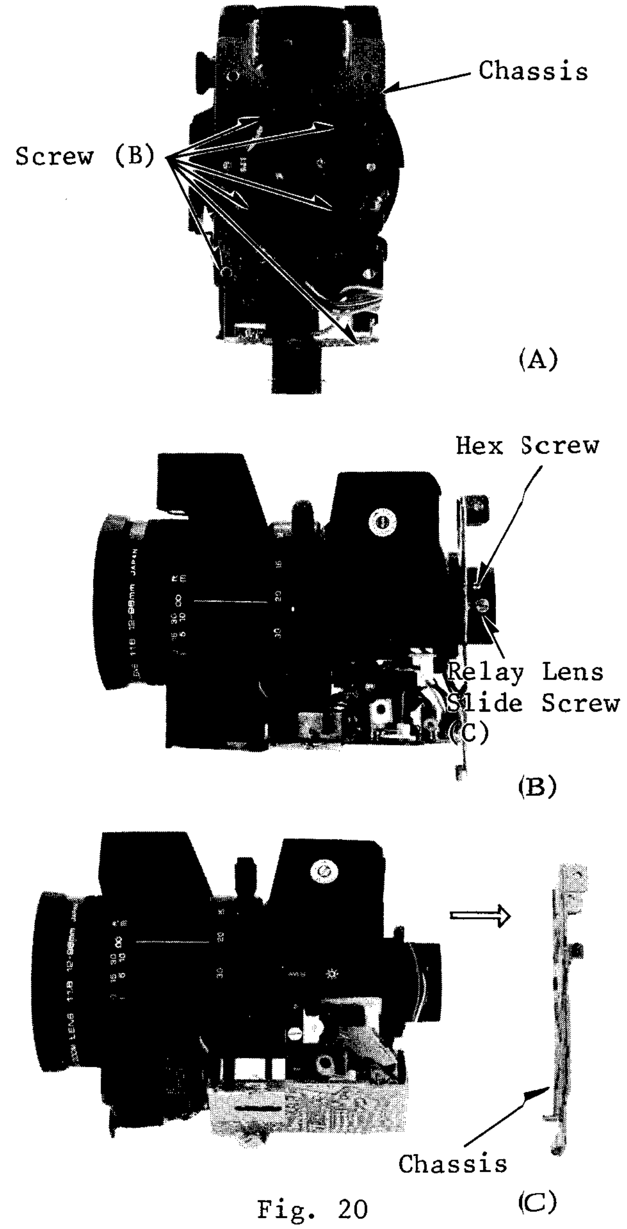

Chassis
Screw (B)
(A)
Hex Screw
Relay Lens Slide Screw (C)
(B)
Chassis
(C)

Fig. 20

5-5. Unscrew 2 screws (D) and open the auto focus lens circuit.

5-6. Then, unscrew 2 screws (E) and remove the zoom motor (see Fig. 21-A/B/C).

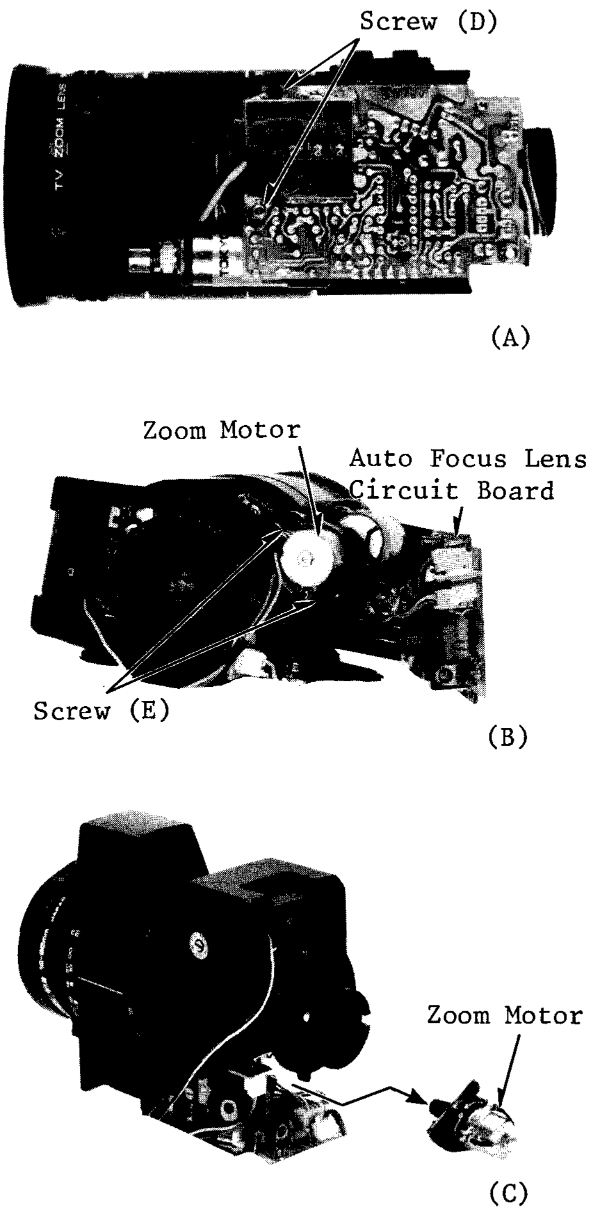

Screw (D)
(A)
Zoom Motor
Auto Focus Lens Circuit Board
Screw (E)
(B)
Zoom Motor
(C)

Fig. 21 Lens and Zoom Motor

5-7. Install the new zoom motor.

5-8. Before assembling the power zoom lens to the chassis, confirm that there are no dust on the lens surface.

5-9. Reverse the previous steps.

6. REPLACEMENT OF IRIS MOTOR ASSEMBLY (VVAW0013)

6-1. Remove the power zoom lens (refer to section "Replacement of the power zoom lens").

6-2. Remove the A.F. Cover (refer to section "Replacement of Zoom Motor").

6-3. Remove the chassis (refer to section "Replacement of Zoom Motor").

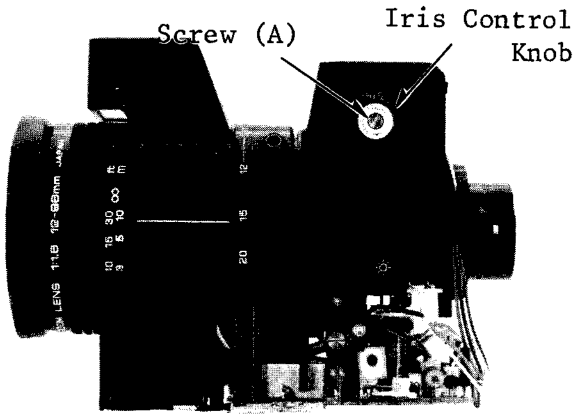

Screw (A)
Iris Control Knob

Fig. 22 Right Side View

6-4. Unscrew a screw (A) and remove the iris control knob (see Fig. 22).

6-5. Then, remove the Back Cover (see Fig. 23).

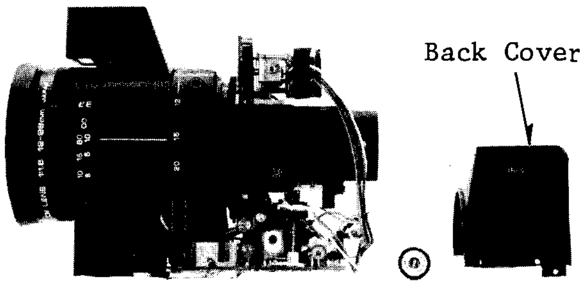


Fig. 23 Lens Ass'y and Back Cover

6-6. Unscrew 4 screws (B) and remove the relay lens assembly with the iris motor assembly (see Fig. 24-A/B).

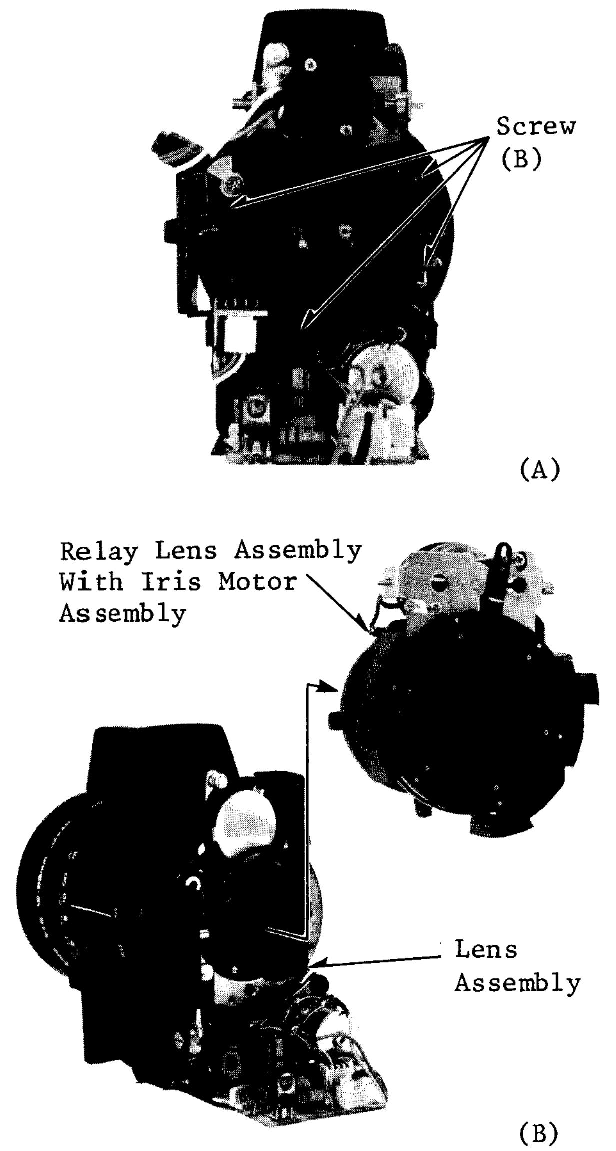

Screw (B)
(A)
Relay Lens Assembly With Iris Motor Assembly
Lens Assembly
(B)

Fig. 24

6-7. Unscrew 3 screws (C) and remove the iris motor assembly (see Fig. 25-A/B).

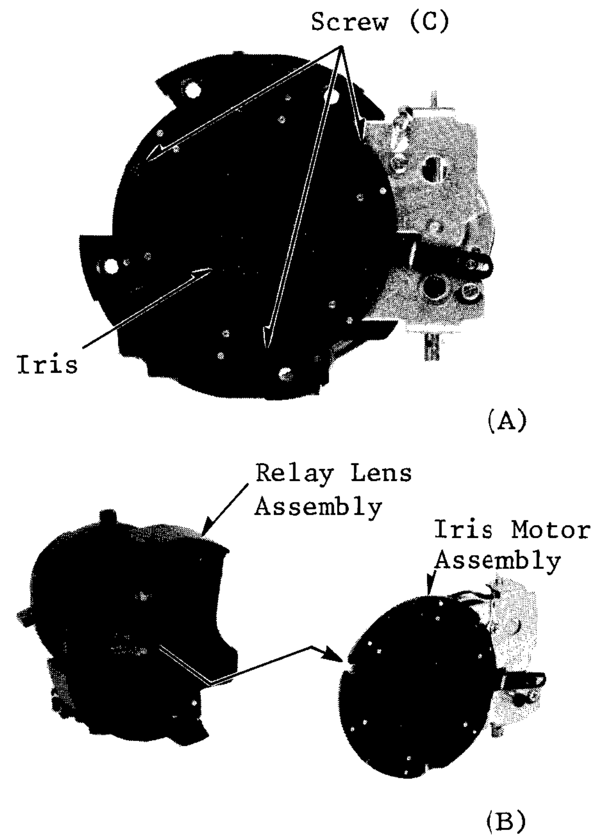

Screw (C)
Iris
(A)
Relay Lens Assembly
Iris Motor Assembly
(B)

Fig. 25

6-8. Install the new iris motor assembly ... before assembly of the iris motor assembly to the chassis, confirm that there are no dust on the iris motor assembly.

6-9. Reverse the previous steps.

Note: When assembling, confirm that both the color temperature correction switch and the AWC switch function properly.

TEST EQUIPMENT/TOOL LIST

1. Light Box w/Chart

	Part Number
Light Box w/Chart Set	VFKS002
Gray Scale Chart	VFKS002A
Color Chart	VFKS002B
Registration Chart	VFKS002C
Resolution Chart	VFKS002D
Light Box	VFKS002Y

Reflection Chart

	Part Number
Reflection Chart Set	VFKS003
Gray Scale Chart	VFKS003A
Color Chart	VFKS003B
Registration Chart	VFKS003C
Resolution Chart	VFKS003D
Color Sheet	VFKS003E

2. 3200°K Studio light (See your local photo supply dealer):
   Minimum requirement is 2 flood lights about 350-500 watts each.
3. Luxmeter
   We recommend one of the following:
   A. Portable luxmeter Model No. 3281 by Yokogawa
      Yokogawa Corporation of America
      2 Dart Road Shenandoah, GA 30265
   B. Electronic Foot Candle Meter by Panlux
      Berkey Marketing Company
      25-30 Brooklyn Queens Expressway Woodside,
      New York 11377
4. FM Detector
   Part No. -------- VFKS001C
5. Oscilloscope
   Dual Trace, 25MHz, 2mV/DIV.
   Minimum Sensitivity with Delay Mode.
6. Vector Scope
7. VTVM or Digital Voltmeter
8. Tripod
9. Frequency Counter
10. Hex Wrench (1.5mm/7mm).

Electrical Adjustment Procedures

Preparations:

To achieve the best adjustment results, warm up the camera for approximately 30 minutes before adjusting.
To prevent short-circuits between the camera body and the undersides of the process and deflection circuit boards, place insulating tape on those portions of the circuit boards that may come in contact with the camera body.

Note:

All board drawings and adjustments are referenced to the foil side of the printed circuit board.

[1] +9V ADJUSTMENT

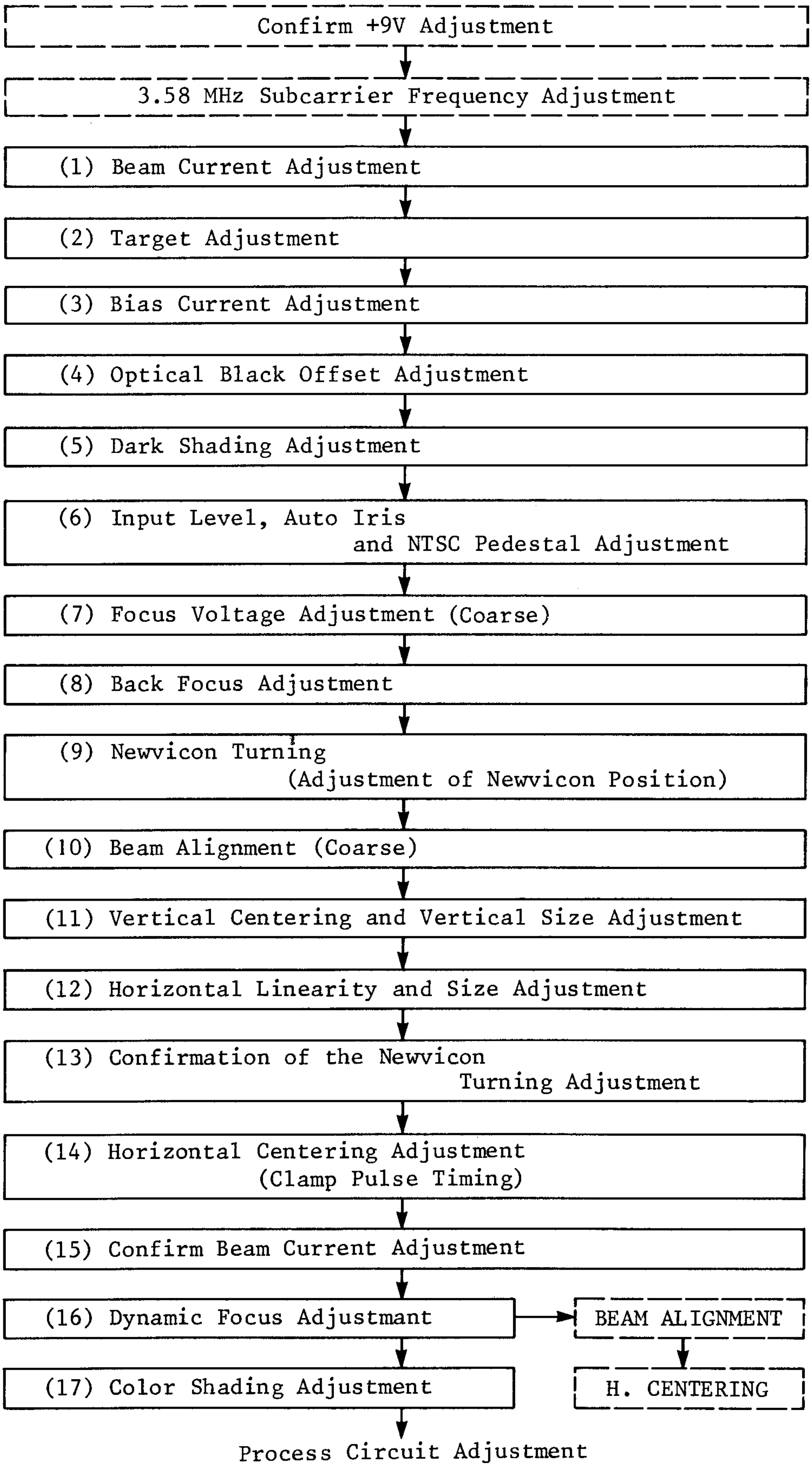
Cautions:

Adjust the voltage to +9 volts. This adjustment should always be performed before any other camera adjustments as voltage adjustment will affect overall camera adjustment. Unless complete camera alignment is to be performed, it is not necessary to adjust the voltage if the error is less than ±0.02 volts.

1. To adjust the voltage to +9 volts, connect a voltmeter to the +9 volt regulator at test point TP607 on the deflection circuit board.
2. Adjust +9V control VR619 so that the voltmeter indicates +9 volts ±0.01 volts.

[2] DEFLECTION CIRCUIT ADJUSTMENT

ADJUSTMENT FLOW CHART OF DEFLECTION CIRCUIT (BOARD)


Confirm +9V Adjustment
3.58 MHz Subcarrier Frequency Adjustment
(1) Beam Current Adjustment
(2) Target Adjustment
(3) Bias Current Adjustment
(4) Optical Black Offset Adjustment
(5) Dark Shading Adjustment
(6) Input Level, Auto Iris and NTSC Pedestal Adjustment
(7) Focus Voltage Adjustment (Coarse)
(8) Back Focus Adjustment
(9) Newvicon Turning (Adjustment of Newvicon Position)
(10) Beam Alignment (Coarse)
(11) Vertical Centering and Vertical Size Adjustment
(12) Horizontal Linearity and Size Adjustment
(13) Confirmation of the Newvicon Turning Adjustment
(14) Horizontal Centering Adjustment (Clamp Pulse Timing)
(15) Confirm Beam Current Adjustment
(16) Dynamic Focus Adjustmant
BEAM ALIGNMENT
(17) Color Shading Adjustment
H. CENTERING
Process Circuit Adjustment

Preparation:

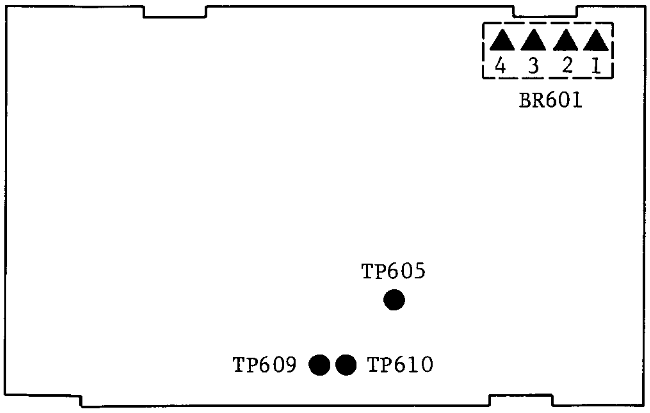
1. Preset the following.

- a. R/B Color Control Knobs (White Balance)
  ... Center position(Detent position)
- b. Iris Control Switch
  ... Manual and Close position
- c. Color Temperature Correction Switch
  ... Indoor position
- d. Standby Switch
  ... Operate position
- e. Negative/Positive Reverse Switch
  ... Normal position

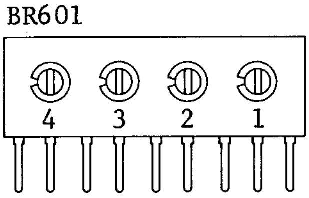
2. Release the Dynamic Focus.

Note:
For this procedure, use test point TP610 as the external trigger for the vertical adjustment, and test point TP609 as the external trigger for the horizontal adjustment. This will ensure the flattest response.

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP605	BR601-1 -2 -3 -4	/	Scope	TP609 HSS TP610 VSS



Deflection C.B.A.



a. First, with the iris control switch, set to the manual, and close the iris, then observe the signal at the horizontal rate at test point TP605.
b. Trigger the oscilloscope with test point TP609.
c. Adjust the horizontal sawtooth control BR601-1 and the horizontal parabola control BR601-2 so that the signal waveform is flattest during the horizontal period as shown in Fig. 1.

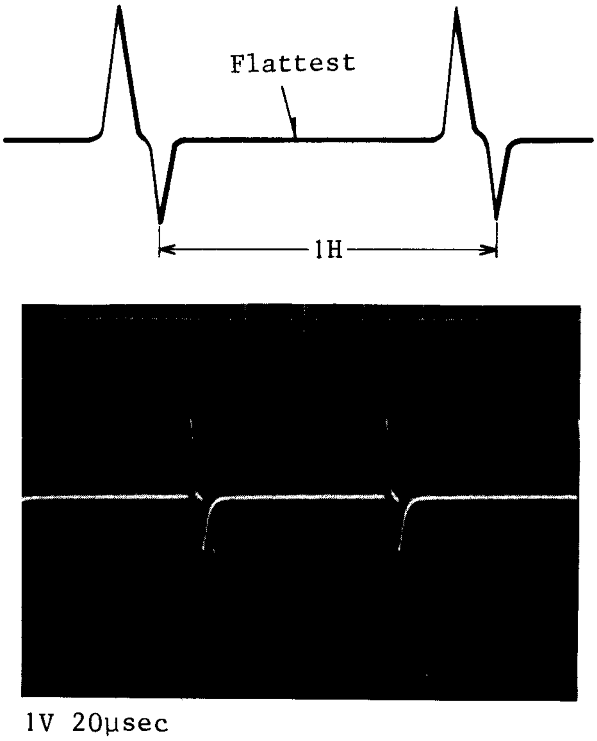
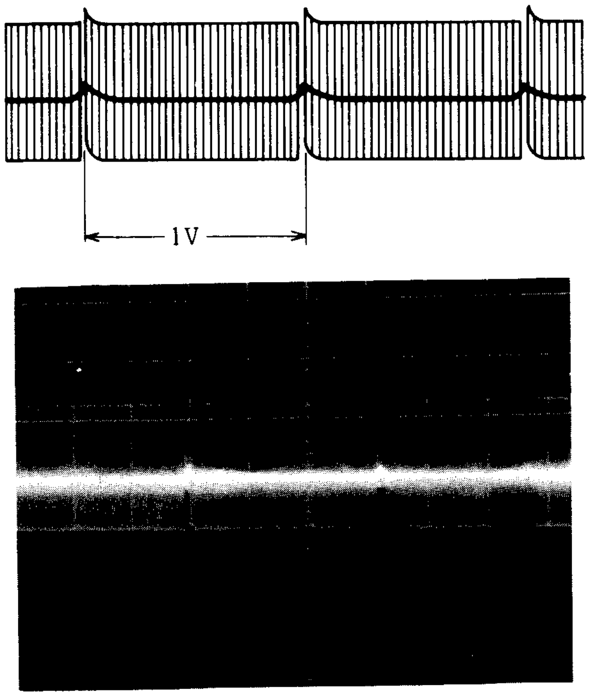


Fig.1

d. Now, observe the signal at the vertical rate at test point TP605, and adjust the vertical parabola control BR601-3 and the vertical sawtooth control BR601-4 so that the signal waveform is flattest during the vertical period as shown in Fig. 2. Trigger the oscilloscope with test point TP610.



1V 5msec

Fig.2

3. Release the color shading.
   Turn BR602 (1,2,3,4) and BR603 (1,2,3,4) to the center position as shown in Fig. 3.

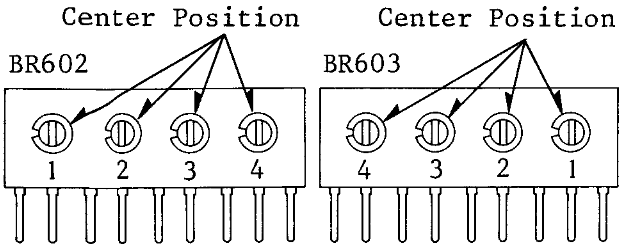
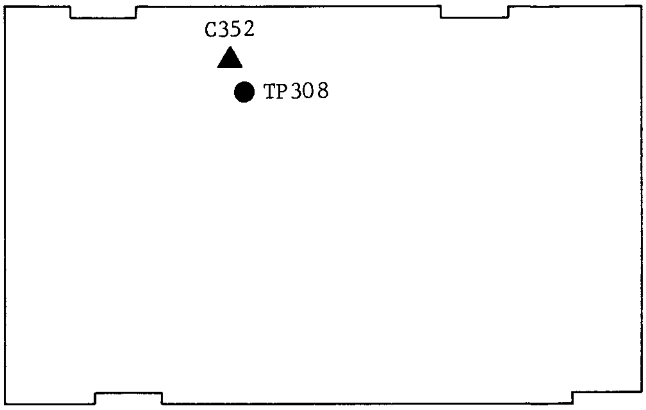

Center Position
Center Position
BR602
BR603
1
2
3
4
4
3
2
1

Fig. 3

4. Release the remaining image correction.
   Turn VR309 fully counterclockwise from the foil side of the circuit board.

5. Adjust the 3.58MHz Sub-Carrier Frequency.

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP308	C352	/	Frequecy Counter	/



Process C.B.A.

a. Measure the sub-carrier frequency at TP308.
b. Adjust capacitor C352 so that the frequency counter indicates 3.579545MHz ± 100Hz.

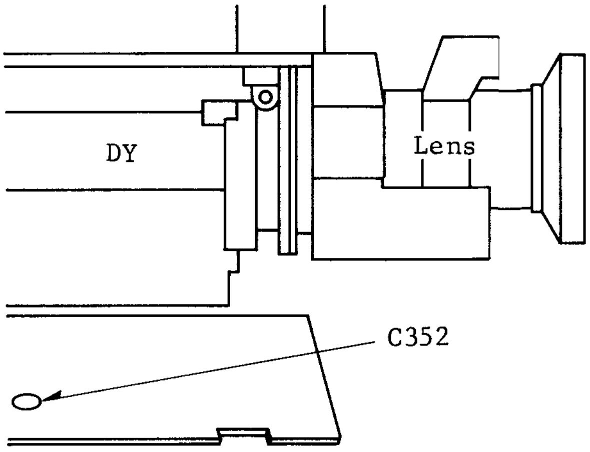
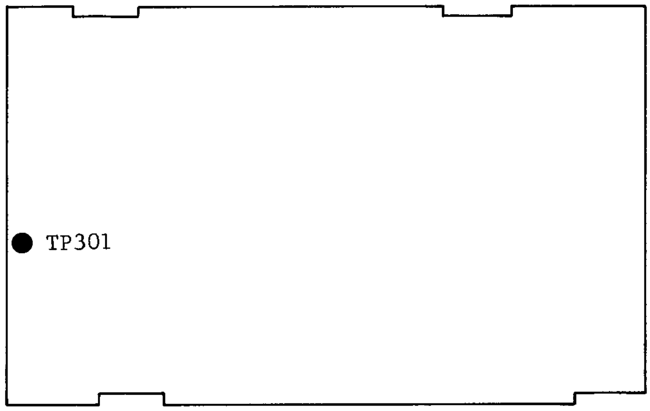

DY
Lens
C352

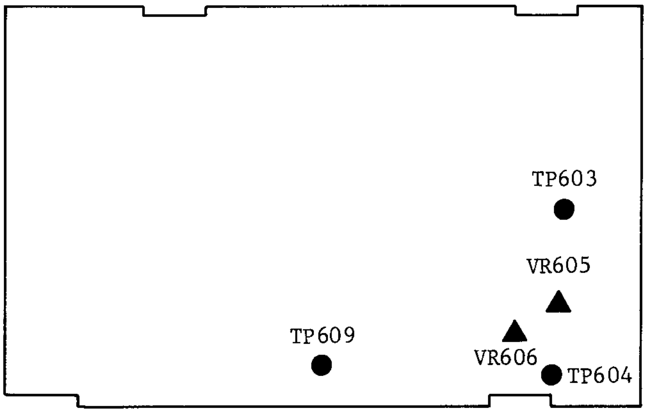
Fig. 4

(1) BEAM CURRENT ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP301 TP603 TP604	VR605 VR606	White Light Box	Scope	TP609 HSS



Process C.B.A.



Deflection C.B.A.

1. Set the iris control switch to auto.
2. Connect the oscilloscope to test point TP301 and observe the signal at the horizontal rate.
3. Connect a 560Ω resistor between TP603 and TP604 to stop the ABO circuit function.
   Trigger the scope using TP609.
4. Aim the camera at the far left edge of a light box or other small light source in order to saturate the beam (waveform does not increase).

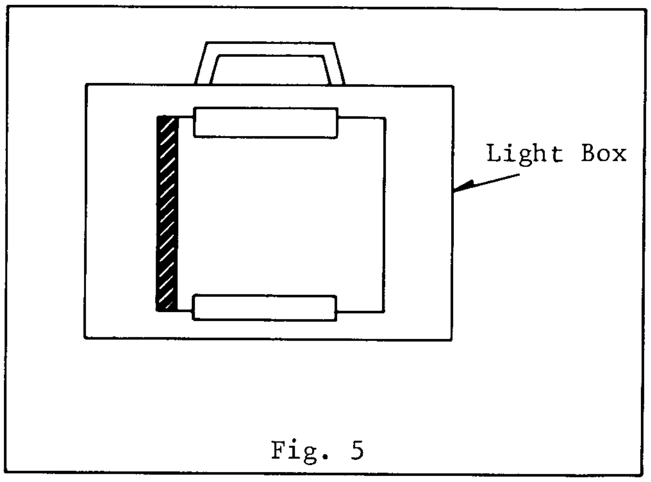


Fig. 5

Note:
Use a low ambient room light when performing this procedure. If lighting is too high, then close the iris manually.

5. Adjust the beam control VR606 so that signal clipping occurs at 2.0 volts peak-to-peak. (See Fig. 6.)

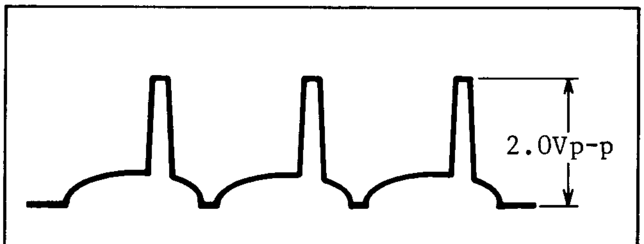


Fig. 6

If the signal is less than 2.0V peak-to-peak, use a more intense light source.
Be careful not to damage the pick-up tube with too strong a light.

6. Disconnect the 560Ω resistor and adjust VR605, so that signal clipping occurs at 2.5V peak-to-peak.

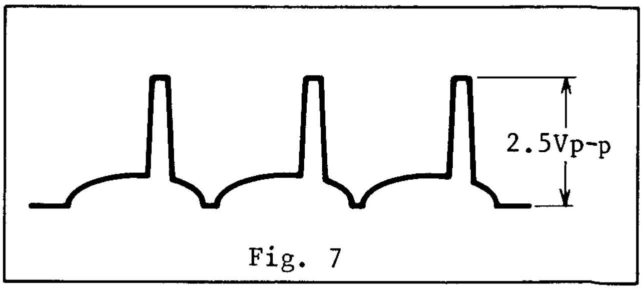
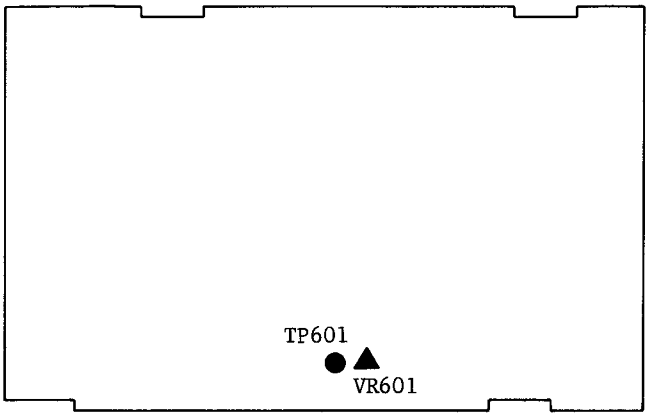


Fig. 7

(2) TARGET ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP601	VR601	/	Voltmeter	/



Deflection C.B.A.

Note:
Before making any adjustments, wait 5 seconds after closing the lens to allow the dark current to stabilize.

1. Set the iris control switch to the manual, and close the iris.
2. Connect the voltmeter to test point TP601 on the deflection circuit board.
3. Wait 5 seconds after closing the lens to allow the dark current to stabilize.
4. Now adjust the target control VR601 so that the voltage at TP601 is equal to the Esj value stamped on the Newvicon neck plus 6V. (Voltage at TP601 = Esj value +6V)

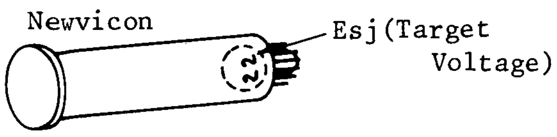
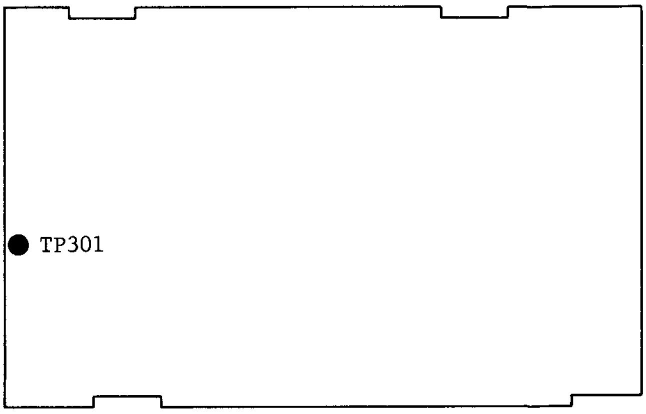


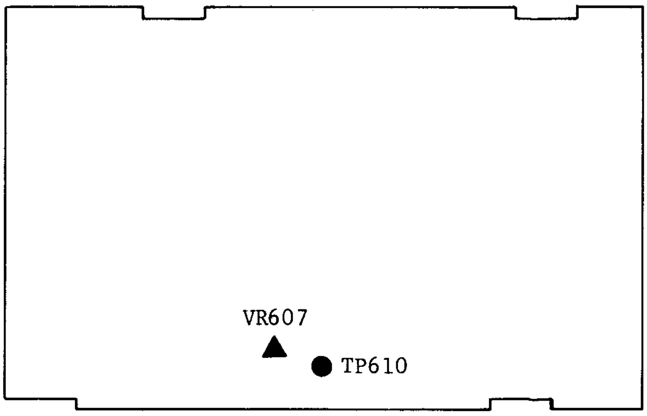
Fig. 8

(3) BIAS CURRENT ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP301	VR607	/	Scope	TP610 VSS



Process C.B.A.



Deflection C.B.A.

1. Set the iris control switch to the manual, and close the iris.
2. Connect the oscilloscope to test point TP301 and observe the signal at the vertical rate.
   Trigger the oscilloscope with test point TP610.
3. Adjust VR607 so that the waveform level is 50mVp-p.

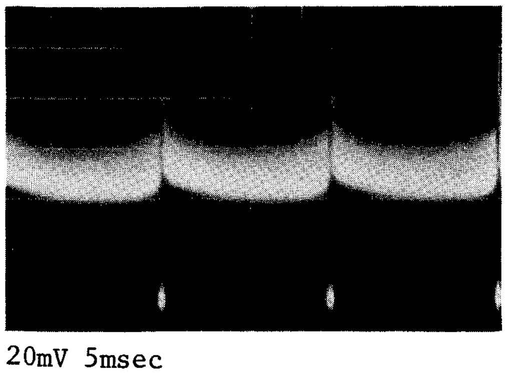
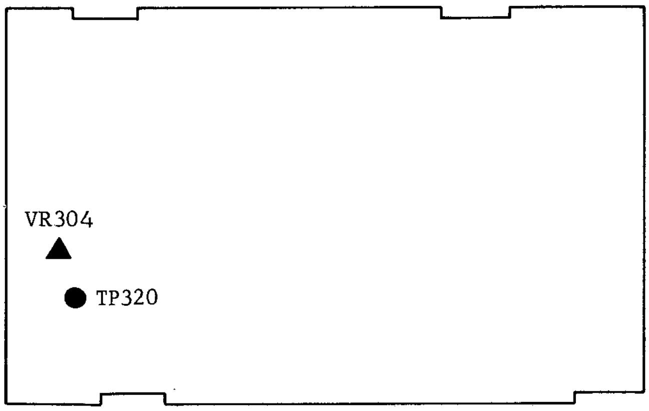


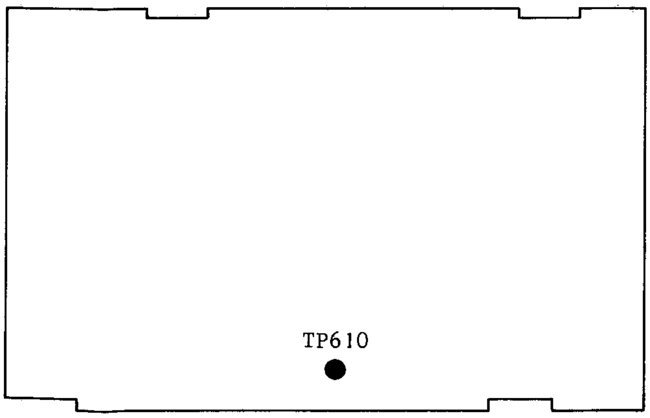
Fig. 9

(4) OPTICAL BLACK OFFSET ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP320	VR304	/	Scope	TP610 VSS



Process C.B.A.



Deflection C.B.A.

Note:

Before starting this adjustment, set the iris control switch to the manual and close the iris, and wait 10 seconds.

1. Set the sensitivity (stnadby) switch to the gain up position.
2. Connect the oscilloscope to test point TP320 and observe the signal at the vertical rate.
   Trigger the oscilloscope with test point TP610.
3. Adjust the optical black offset control VR304 so that the waveform level is about 0mVp-p. (Use center of carrier leakage.)

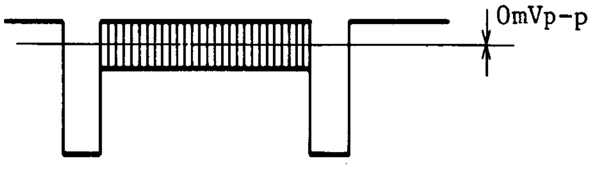


Fig. 10

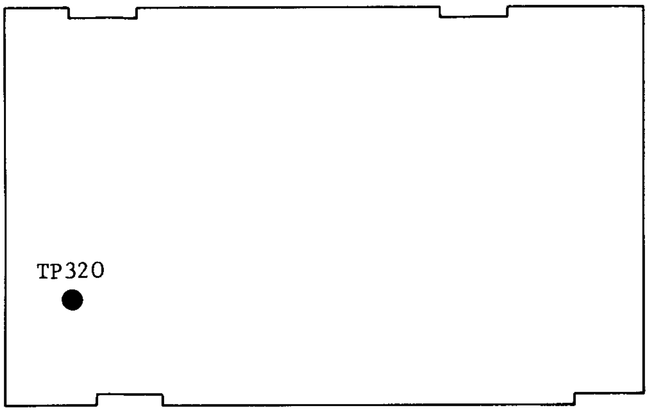
4. Set the sensitivity (standby) switch to the operate position.

(5) DARK SHADING ADJUSTMENT

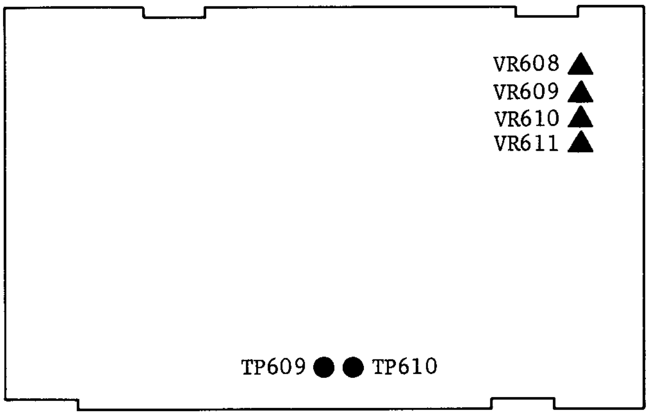
Note:

Before starting this adjustment, set the iris control switch to manual and close the iris, and wait 10 seconds.

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP320	VR608,VR609 VR610,VR611	/	Scope	TP610 VSS TP609 HSS



Process C.B.A.



Deflection C.B.A.

1. Set the sensitivity (standby) switch to the gain up position.
2. Connect the oscilloscope to test point TP320 and observe the signal at the vertical rate.
   Trigger the oscilloscope with test point TP610.
3. Adjust the dark shading control (V. Para.), VR610 and the dark shading control (V. Saw.), VR611 so that the signal waveform is flattest during the vertical period as shown in Fig. 11.

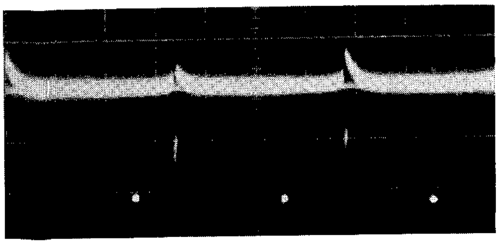


Fig. 11

4. Now, observe the signal at the horizontal rate at test point TP320, and adjust the dark shading control (H. Saw.), VR608 and the dark shading control (H. Para.), VR609 so that the signal waveform is flattest during the horizontal period as shown in Fig. 12.
   Trigger the oscilloscope with test point TP609.

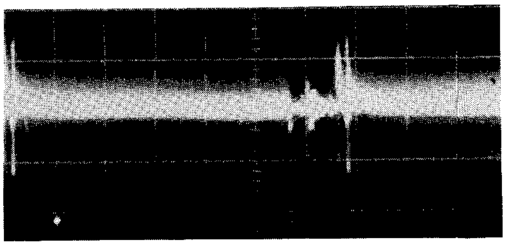
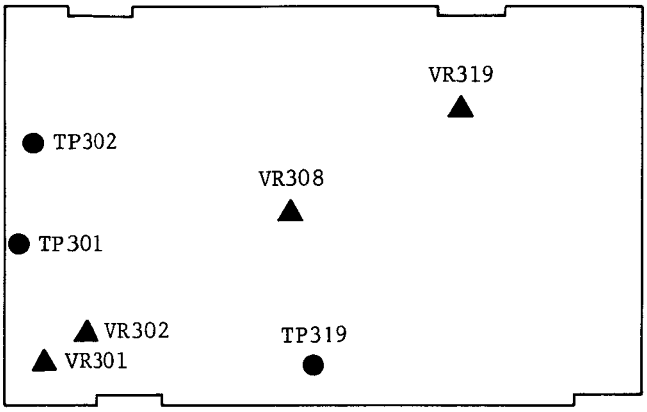


Fig. 12

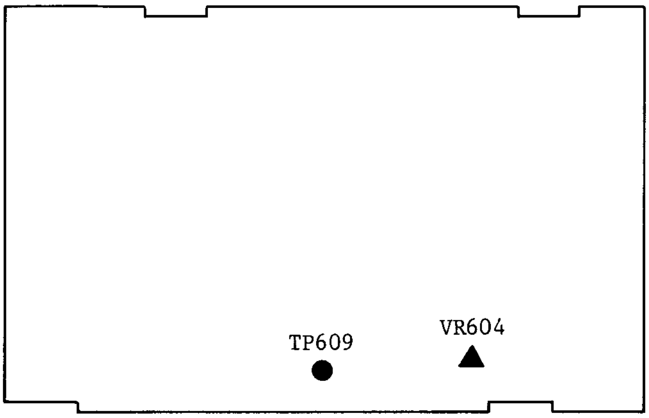
5. Check the optical black offset adjustment and, if necessary, readjust the optical black offset control VR304.
6. Set the sensitivity (standby) switch to the operate position.
7. Finally, set the iris control to auto.

(6) INPUT LEVEL, AUTO IRIS AND NTSC PEDESTAL ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP301 TP302 TP319	VR301 VR302 VR308 VR319 VR604	Gray Scale	Scope	TP609 HSS



Process C.B.A.



Deflection C.B.A.

Note:

If a reflection type gray scale chart is used, a light intensity of between 1,400 and 2,000 lux will be required.

1. Aim the camera at the gray scale chart and set iris control to "Auto".
2. Connect the oscilloscope to test point TP301 and observe the signal at the horizontal rate.
   Trigger the oscilloscope with test point TP609.
3. Then to release the carrier signal, turn focus control VR604 fully clockwise (from foil side of the board).
4. Adjust VR301 to 600mVp-p.

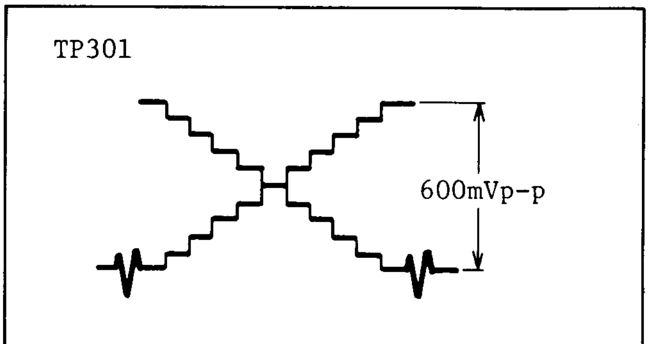


Fig. 13

5. Connect the oscilloscope to test point TP302 and observe the signal at the horizontal rate.
6. Adjust the focus control VR604 so that the signal level is maximized.

7. Set iris control to manual and close the lens iris.
8. Connect the oscilloscope to test point TP319 and observe the NTSC signal.
9. Adjust VR308 to 50mVp-p.

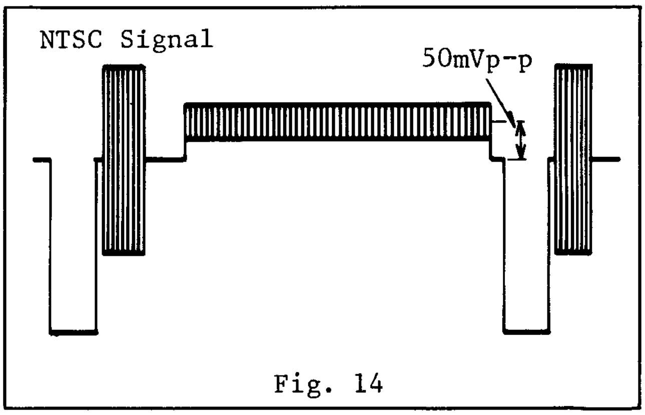


Fig. 14

10. Set iris control to auto and aim the camera at the gray scale chart.
11. Now, observe the NTSC signal at the horizontal rate at test point TP319.
12. Turn VR319 fully clockwise position, to reduce the carrier signal.
13. Adjust VR306 to 0.7Vp-p.
14. Turn VR319 fully counterclockwise
15. Confirm that signal at TP301 is 600mVp-p.
    If it is not then readjust.

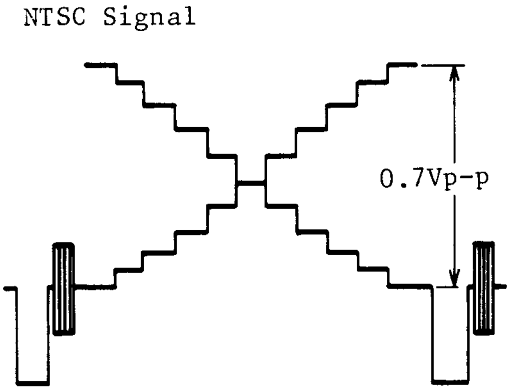


Fig. 15

(7) FOCUS VOLTAGE ADJUSTMENT (COARSE)

1. Aim the camera at an evenly illuminated white surface (use 1,500 lux or Light Box) and focus the lens.
2. Adjust the focus control VR604, so that the magenta area in the monitor picture is maximized and the green area is minimized.

(8) BACK FOCUS ADJUSTMENT

1. Aim the camera at an object more than 10 meters (33 feet) away, and zoom all the way in (maximum close up).
2. Focus the lens on the object.
3. Loosen the hex screw using a 1.5mm hex wrench on the relay lens. (See Fig. 16.)

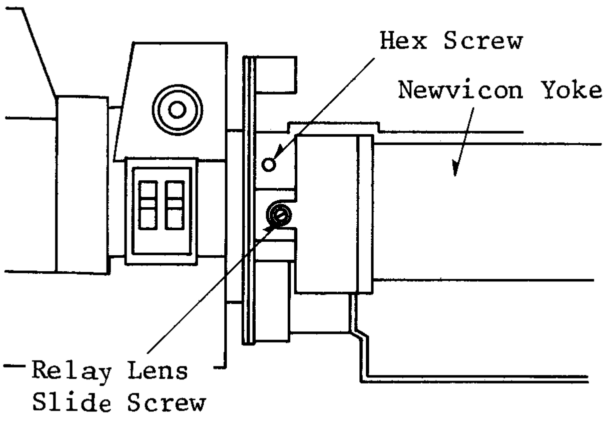
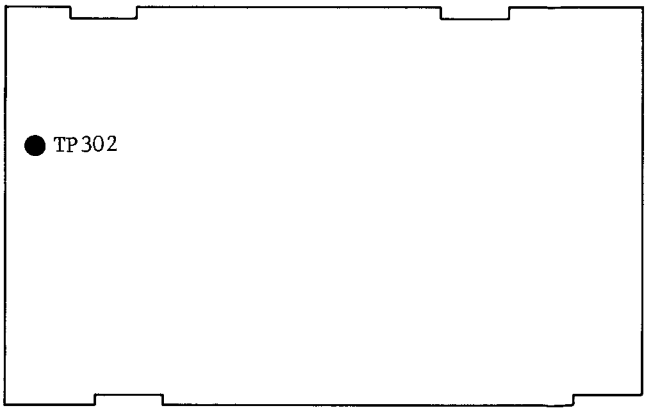


Fig. 16 Deflection Yoke View

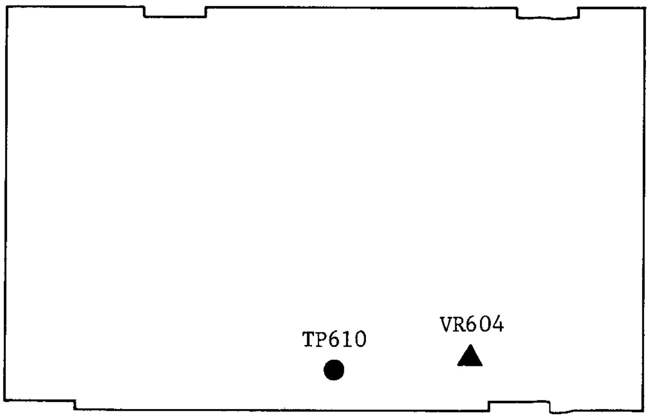
4. Zoom all the way back and adjust the relay lens slide screw until the sharpest focus is obtained.
5. Repeat this procedure--zoom in, focus, zoom out, and adjust--until the best focus is obtained over the entire zoom range.
6. Tighten the hex screw using a 1.5mm hex wrench on the relay lens. Do not overtighten the hex screw. You may crack the lens assembly or the lens housing.

(9) NEWVICON TURNING (ADJUSTMENT OF NEWVICON POSITION)

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP302	VR604 Newvicon Turning	White	Scope	TP610 VSS



Process C.B.A.



Deflection C.B.A.

1. Aim the camera at a white chart or white screen and focus the lens.
2. Connect the oscilloscope to test point TP302 and observe the signal at the vertical rate.
   Trigger the oscilloscope with test point TP610.
3. Adjust Focus Control VR604 for maximum signal level as shown in Fig. 17.

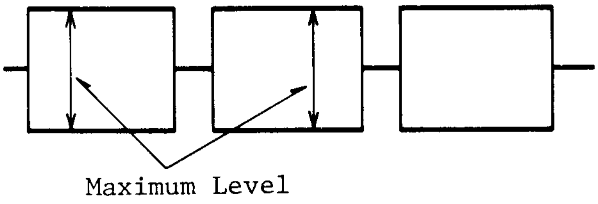

Maximum Level

Fig. 17

4. Delay the sweep of the center portion of the vertical signal waveform and observe a few horizontal lines.
5. Loosen the newvicon clamp screw on the deflection yoke assembly as shown in Fig. 18.

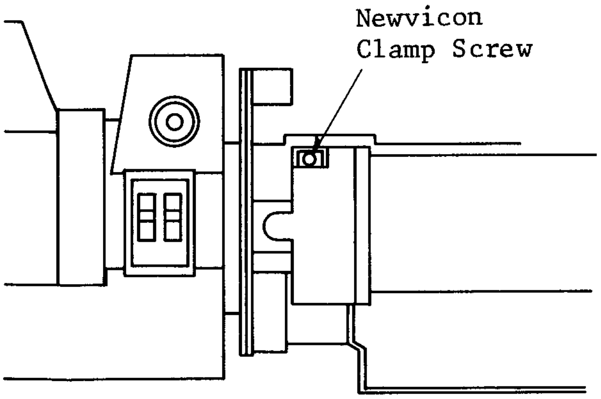
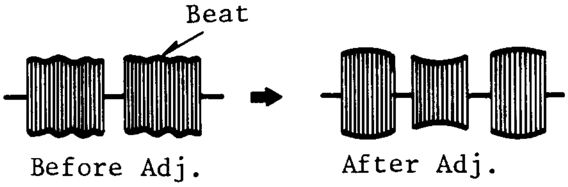

Newvicon
Clamp Screw

Fig. 18 Deflection Yoke View

6. Now, rotate the newvicon socket from the back, using a 7mm hex wrench, so that the waveform for each horizontal scan line is free from beat and ripple.
   Do not worry about differences in amplitude.


Beat
Before Adj.
After Adj.

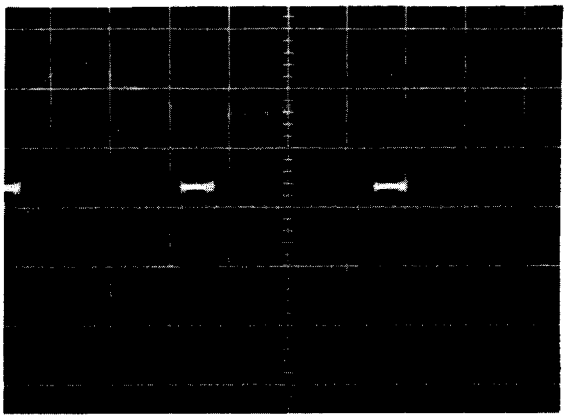


Fig. 19 Waveform of Proper Newvicon Turning

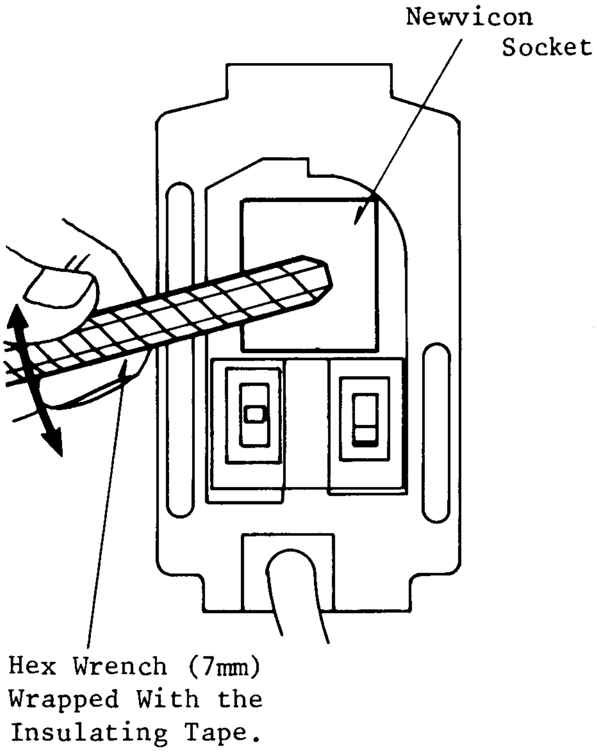

Newvicon
Socket
Hex Wrench (7mm)
Wrapped With the
Insulating Tape.

Fig. 20

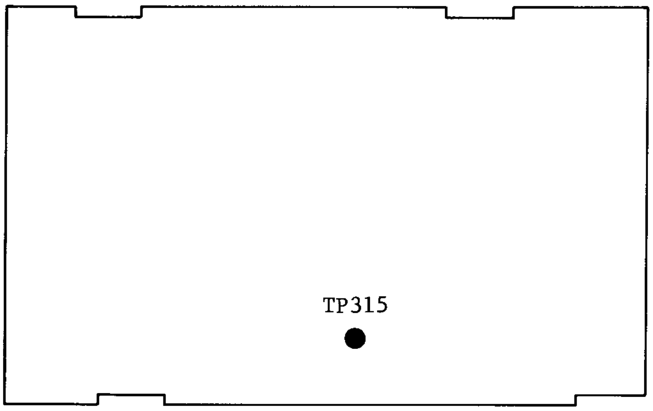
Note:

Be careful not to touch the connector on the newvicon. The high voltage at the connector may give you a severe shock and perhaps damage the newvicon.

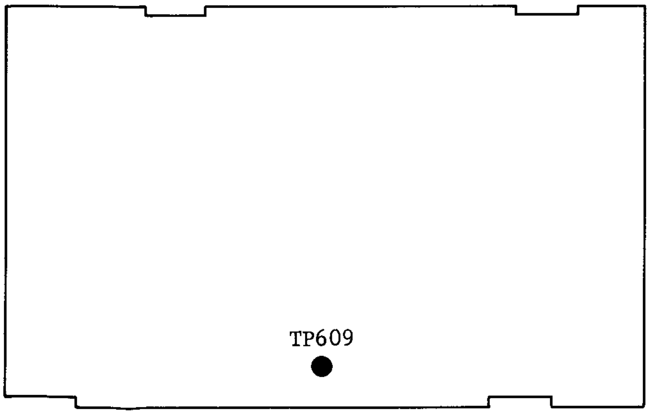
7. Finally, tighten the newvicon clamp screw.

(10) BEAM ALIGNMENT (COARSE)

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP315	Two Alignment Rings	White	Color Monitor Scope	TP609 HSS



Process C.B.A.



Deflection C.B.A.

1. Cut the lock paint on the alignment rings before attempting to rotate the rings.
2. Aim the camera at a white chart or white screen, and turn the Red color control knob clockwise.

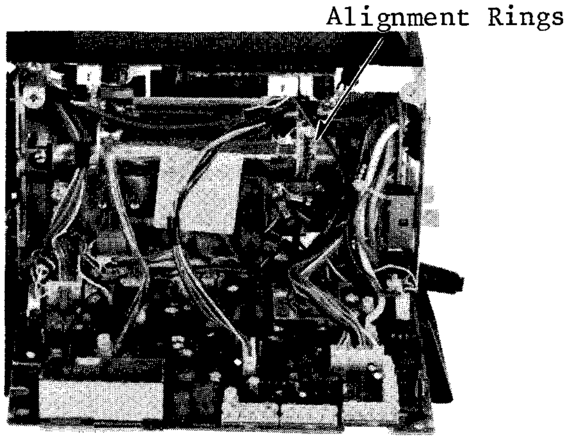


Fig. 21

3. Connect the oscilloscope to test point TP315 and observe the R-Y signal at the horizontal rate. Trigger the oscilloscope with test point TP609.
4. Observe the raster on the TV monitor, and adjust the two alignment rings (See Fig. 21.) so that the signal level is minimized and the magenta color covers the whole screen as shown in Fig. 22.

Note:

You may observe discoloration at the edges and corners.
Disregard this as the Dynamic Focus adjustment procedure will clean this up.

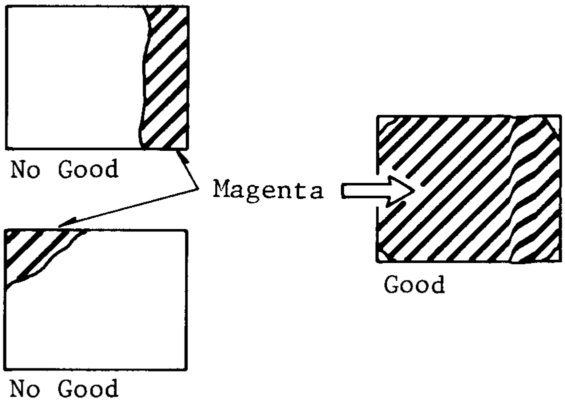
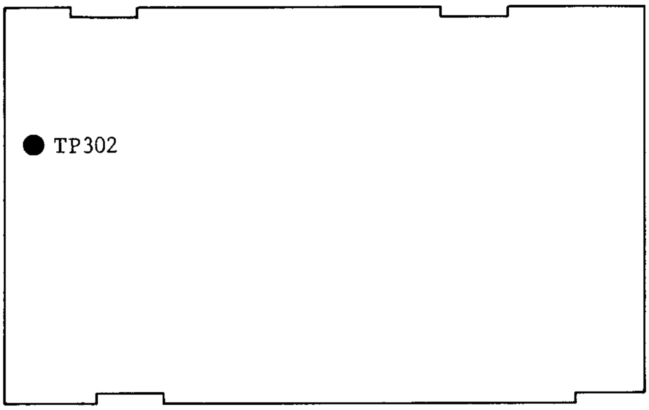


Fig. 22 TV Screen

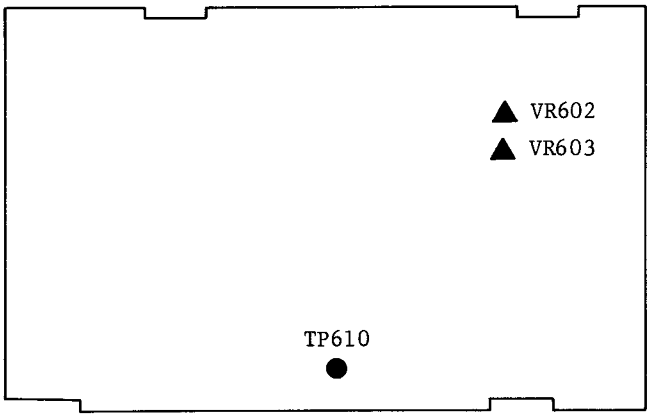
5. Paint-lock the alignment rings with either white paint or lacquer.
6. Finally, turn the Red color control knob back to the center position.

(11) VERTICAL CENTERING AND VERTICAL SIZE ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP302 5.0 MHz Carrier	VR602 V. Size VR603 V. Cent.	White	Scope	TP610 VSS

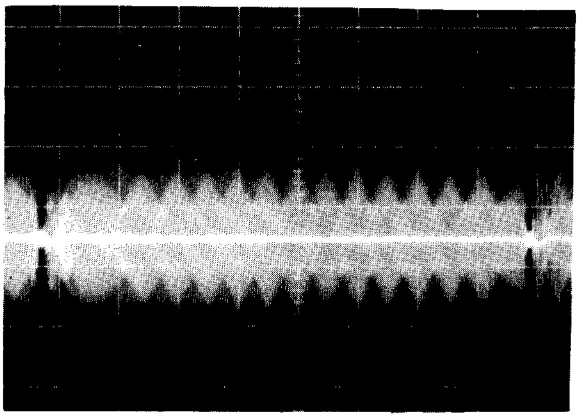


Process C.B.A.

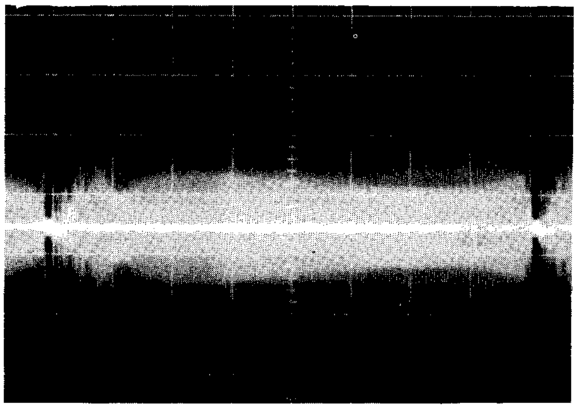


Deflection C.B.A.

1. Aim the camera at a white chart.
2. Connect the oscilloscope to test point TP302 and observe the vertical interval of the 5.0MHz carrier signal.
   Trigger the oscilloscope with test point TP610.
3. Adjust the vertical size control, VR602, so that the beat in the signal is minimized. These beats will appear if the vertical size is not properly adjusted. Properly adjusted, there should be a maximum of one beat per envelope.



Before Adj.
0.2V 2msec



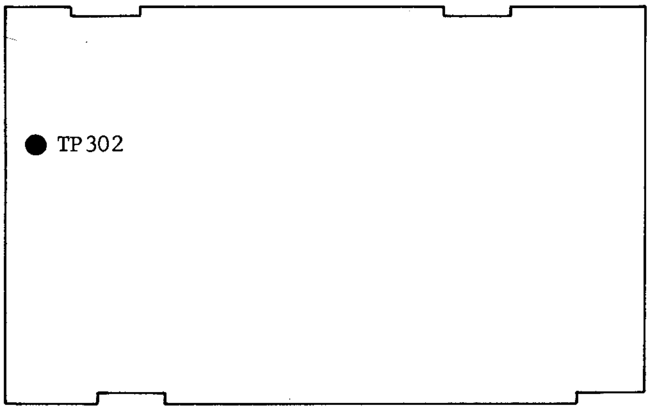
After Adj.
0.2V 2msec

Fig. 23 Waveform of V. Period at TP302

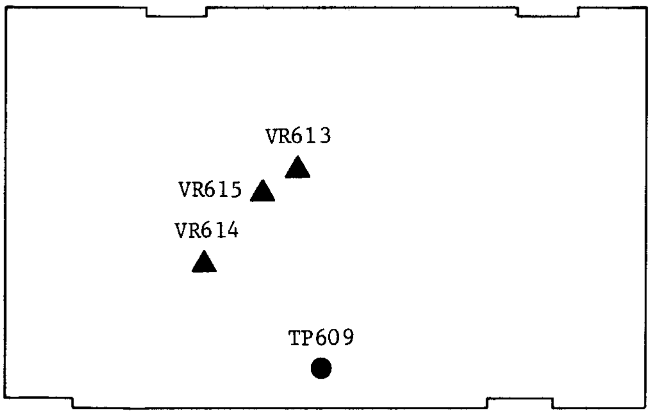
4. Now aim the camera at a small object so that the object is in the center of the monitor screen.
5. Adjust the vertical center control, VR603, so that the small object does not shift vertically as you zoom in and out.

(12) HORIZONTAL LINEARITY AND SIZE ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP302 5.0 MHz Carrier Compsite Blanking	VR613 H. Size VR614 H. Lin. (1) VR615 H. Lin. (2)	White	Scope FM Detector	TP609 HSS



Process C.B.A.


VR613
VR615
VR614
TP609

Deflection C.B.A.

1. Aim the camera at a white chart or white screen.
2. Check the focus adjustment and, if necessary, readjust Focus Control VR604.
3. Turn the FM detector knob to the Horizontal Size and Linearity position.
4. Turn the switch on the rear panel to the 5.0MHz position.

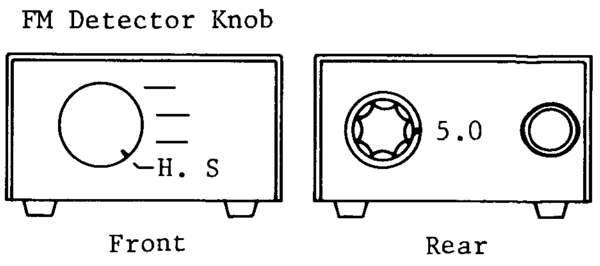

FM Detector Knob
H. S
5.0
Front
Rear

Fig. 24 FM Detector

5. Connect the FM detector input to test point TP302, and connect the FM detector output to the oscilloscope input.
   Connect the FM detector blanking to test point TP309.
   Connect the FM detector +9V line to test point TP607.
   Connect the FM detector ground to the camera ground.

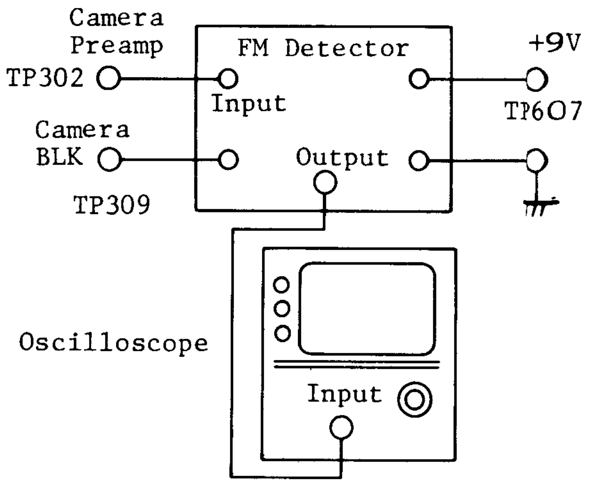

Camera Preamp
TP302
FM Detector
+9V
Input
TP607
Camera BLK
Output
TP309
Oscilloscope
Input

Fig. 25 Connection of FM Detector

6. Now, adjust the horizontal size control VR613, so that the signal is centered on the blanking line, as shown in Fig. 26.
   Trigger the oscilloscope with test point TP609.

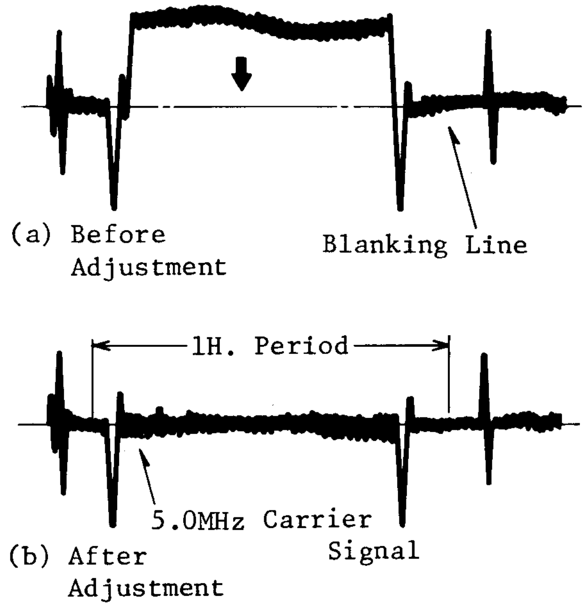


Fig. 26 Waveform of Proper Adjustment

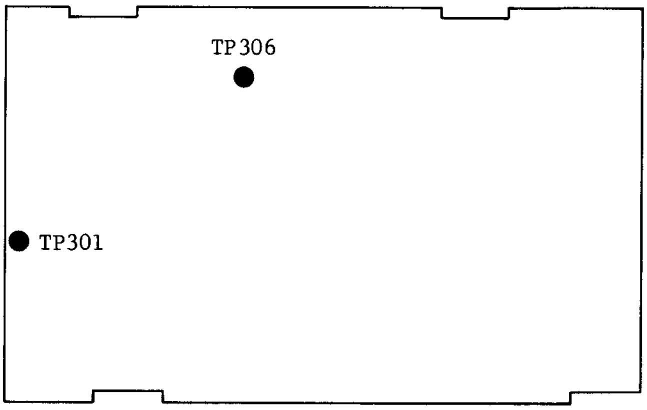
7. Finally, adjust the horizontal linearity 1 control VR614, and the horizontal linearity 2 control, VR615, so that the waveform on the oscilloscope is as flat as possible. Horizontal Linearity 1 controls the horizontal sweep for the left side of the picture, while Horizontal Linearity 2 controls the overall linearity.

(13) CONFIRMATION OF THE NEWVICON TURNING ADJUSTMENT

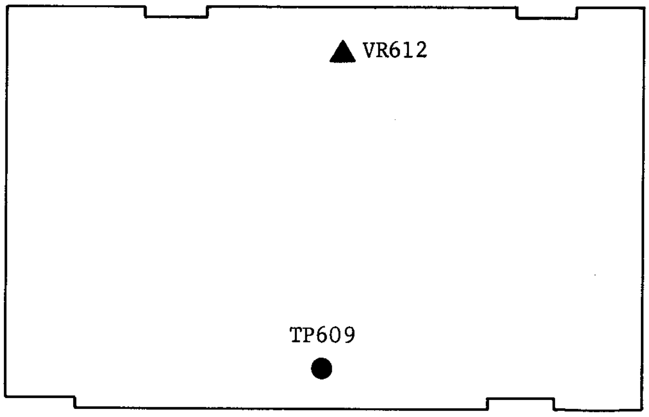
Check the newvicon turning adjustment and adjust it if necessary. If the adjustment is correct, go on to the next procedure, step (14).

(14) HORIZONTAL CENTERING ADJUSTMENT (Clamp Pulse Timing)

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP301 Preamp Output TP306 CP1	VR612 H. Cent.	White	Scope	TP609 HSS



Process C.B.A.



Deflection C.B.A.

1. Aim the camera at a white chart.
2. Next, connect an oscilloscope probe to test point TP301 and observe the horizontal blanking interval of the signal.
   Trigger the oscilloscope with test point TP609.
3. Connect the other oscilloscope probe to the clamp pulse 1 (CP1) test point, TP306.
4. Set the oscilloscope in the delay mode.

5. Adjust the horizontal centering control, VR612, so that the time between the trailing edge of the video signal, in other words, the front porch of the optical black, and the leading edge of the clamp pulse 1 signal (TP306) is 1.5μsec. as shown in Fig. 27.

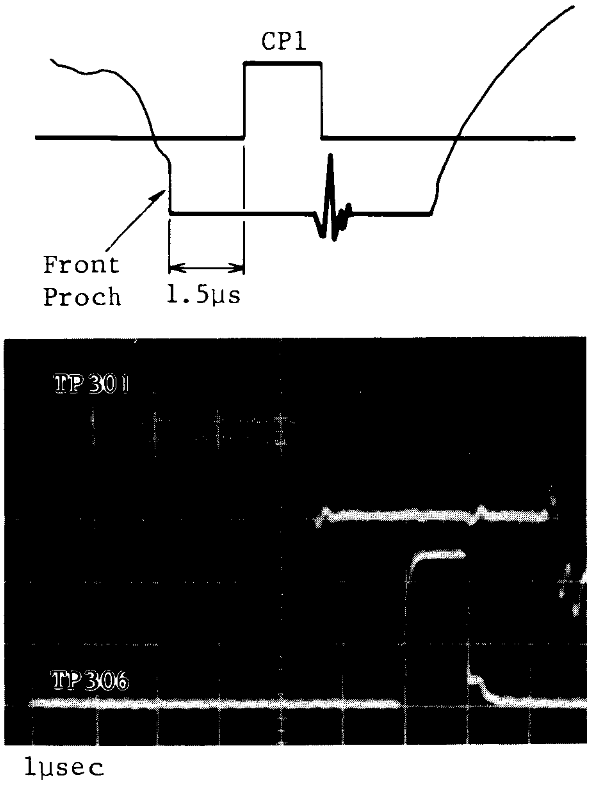


Fig. 27 Waveform for H. Cent.
(H. Blanking Signal at TP301 and CP1)

Note:

With some newvicons, the oscilloscope display will show a double trace at the end of a horizontal line. If this should occur, reconfirm the newvicon turning adjustment. If the newvicon adjustment is correct, adjust the horizontal centering control VR612 so that the time between the trailing edge (a) of the video signal and the leading edge of the clamp pulse 1 signal is 1.5μsec.

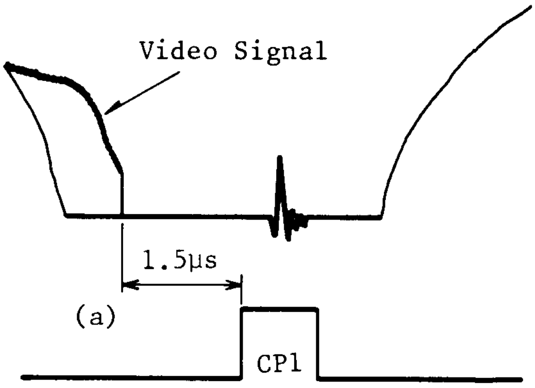


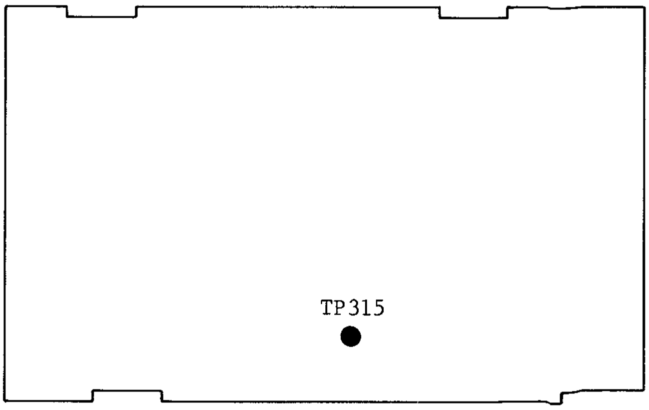
Fig. 28

(15) CONFIRM BEAM CURRENT ADJUSTMENT

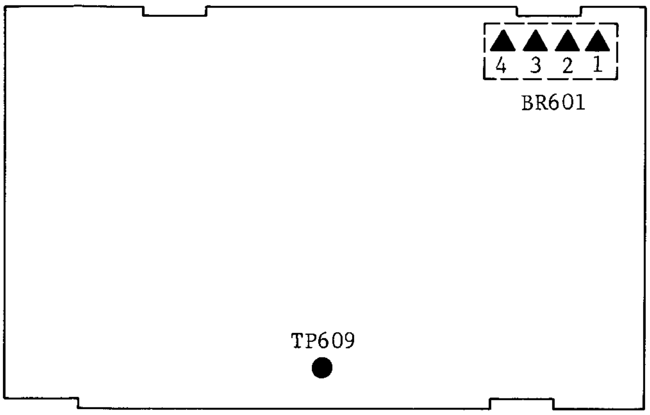
If the target adjustment is made, check and readjust the beam current (step 1) if necessary.
If the adjustment is correct, go on to the next procedure, step (16).

(16) DYNAMIC FOCUS ADJUSTMENT

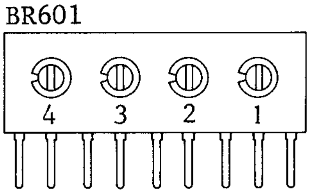
TP	Adj.	Chart	Test Instrument	Scope Trigger
TP315 R-Y Signal	BR601-1 H. Saw. BR601-2 H. Para. BR601-3 V. Para. BR601-4 V. Saw.	White	Scope Color Monitor	TP609 HSS



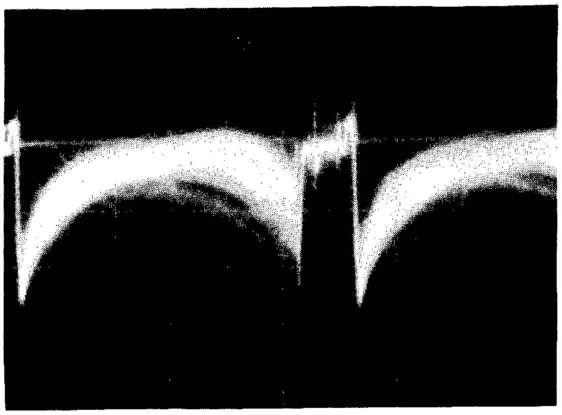
Process C.B.A.



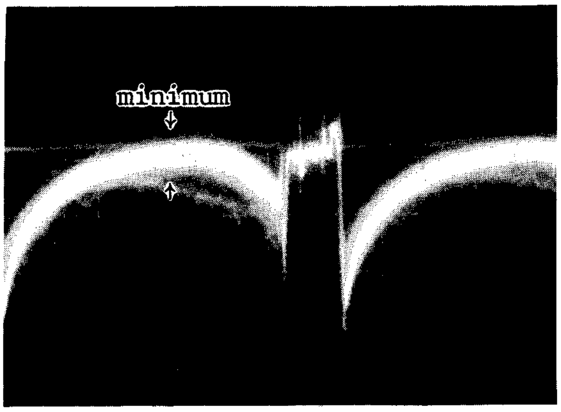
Deflection C.B.A.



1. Aim the camera at a white chart.
2. Observe the color monitor and adjust the focus control, VR604, so that the center area of monitor shows a red (magenta) color (minimize green color), if necessary.
3. Connect the oscilloscope to test point TP315 and observe the R-Y signal at the horizontal rate. Trigger the oscilloscope with test point TP609.
4. Alternately adjust vertical parabola control, BR601-3 and vertical sawtooth control, BR601-4 so that the signal level is minimized as shown in Fig. 29.



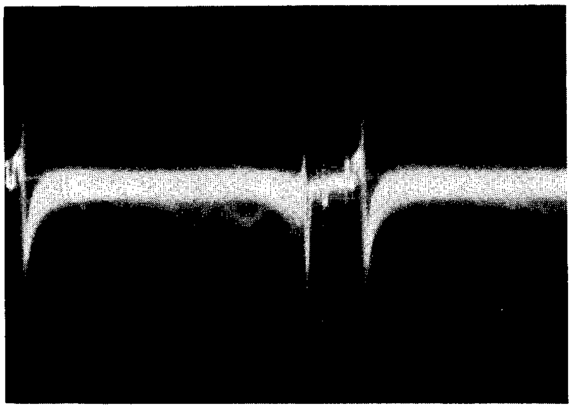
Before Adj.
100mV 10μsec
V. rate



After Adj.
100mV 10μsec
V. rate

Fig. 29 Waveform of TP315

5. Then, alternately adjust horizontal sawtooth control, BR601-1 and horizontal parabola control, BR601-2 for the signal waveform to be flattest during the horizontal period as shown in Fig. 30.



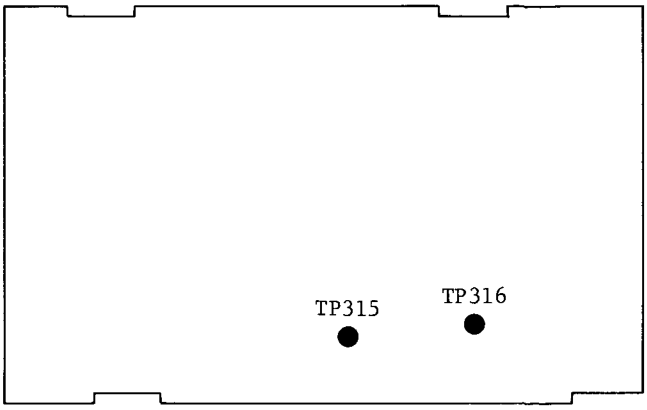
100mV 10μsec
H. rate

Fig. 30 Waveform of TP315

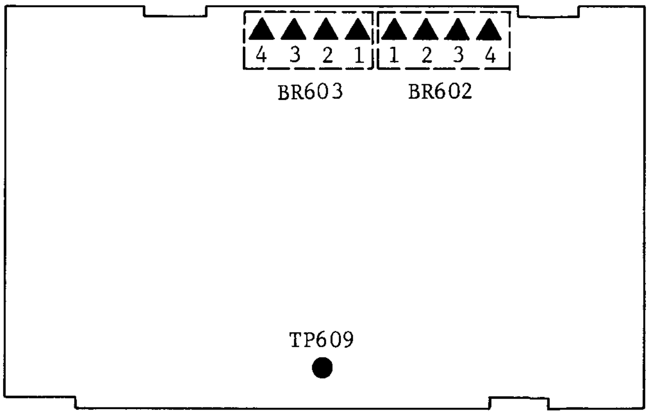
6. Check the color TV monitor for green tinting in the corners and at the sides. In most cases, the green tinting will be eliminated by these adjustments.
7. If, however, there is still some green tinting present, fine-adjust the alignment rings on the newvicon until the green tinting is completely eliminated.
8. After fine-adjusting the alignment rings, it will be necessary to re-adjust the horizontal centering. Refer to step (14), the horizontal centering adjustment procedure.
9. Now, confirm that the horizontal linearity and size adjustments performed earlier have not shifted.
10. Also confirm that the vertical size adjustment has not shifted.

(17) COLOR SHADING ADJUSTMENT

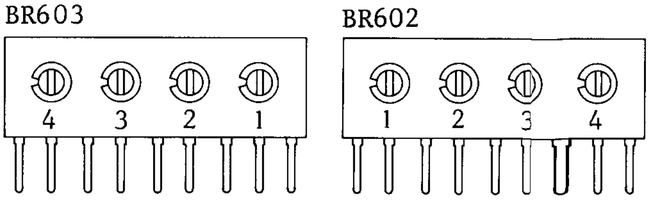
TP	Adj.	Chart	Test Instrument	Scope Trigger
TP315 R-Y Signal	BR603-1 -2 -3 -4	White	Scope Color Monitor	TP609 HSS
TP316 B-Y Signal	BR602-1 -2 -3 -4			



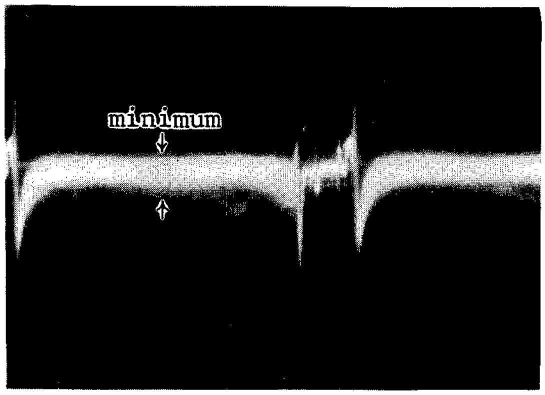
Process C.B.A.



Deflection C.B.A.



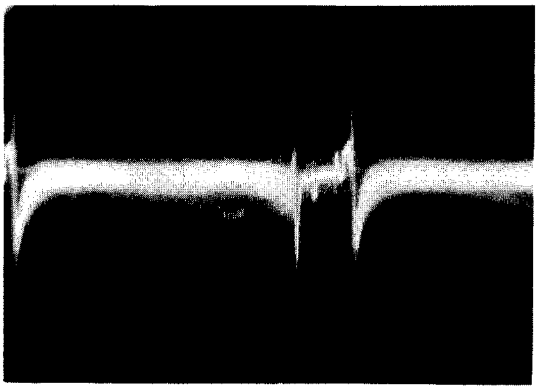
1. Aim the camera at a white chart of a light box.
   If a reflection chart is used, a light intensity of about 4,000 lux will be required.
   Next, confirm that the R/B color control knobs set the center position.
2. Connect the oscilloscope to test point TP315 and observe the R-Y signal at the horizontal rate.
   Trigger the oscilloscope with test point TP609.
3. Alternately adjust BR603-3 and BR603-4 so that the signal level is minimized as shown in Fig. 31.



100mV 10µsec
V. rate

Fig. 31 Waveform of TP315

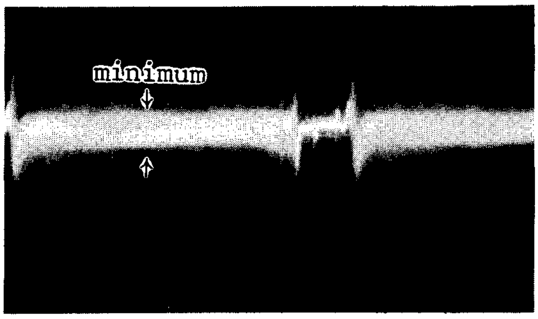
4. Then, alternately adjust BR603-1 and BR603-2 for the signal waveform to be flattest during the horizontrl period as shown in Fig. 32.



100mV 10µsec
H. rate

Fig. 32 Waveform of TP315

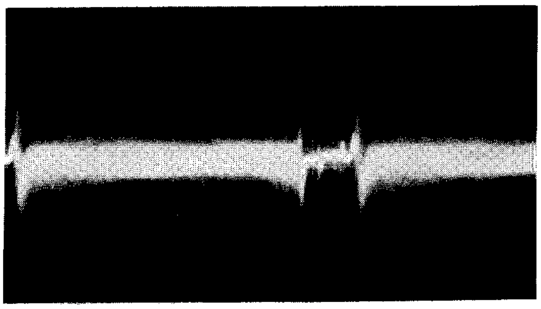
5. Now connect the oscilloscope to test point TP316 and observe the B-Y signal at the horizontal rate. Trigger the oscilloscope with test point TP609.
6. Alternately adjust BR602-3 and BR602-4 so that the signal level is minimized as shown in Fig. 33.



100mV 10µsec
V. rate

Fig. 33 Waveform of TP316

7. Then, alternately adjust BR602-1 and BR602-2 for the signal waveform to be flattest during the horizontal period, as shown in Fig. 34.



100mV 10µsec

Fig. 34 Waveform of TP316

[3] PROCESS CIRCUIT ADJUSTMENT

ADJUSTMENT FLOW CHART FOR PROCESS CIRCUIT

(1) Color Gamma Circuit Release
↓
(2) Vertical Edge Balance Adjustment
↓
(3) Red/Blue Signal Separation Adjustment
↓
(4) Carrier Balance Adjustment
↓
(5) R and B Gain, Gamma Reference Voltege Adjustment
↓
(6) R and B Gamma Adjustment
↓
(7) White Balance Fine Adjustment
↓
(8) High Luminance Chroma Clip Adjustment
↓
(9) Confirmation of The NTSC Pedestal Adjustment
↓
(10) Vertical Edge Gain Adjustment
↓
(11) Color Signal Adjustment
↓
(12) Confirmation of Resolution
↓
(13) AWC (Automatic White Balance Control) Adjustment
↓
(14) Remaining Image Adjustment
↓
(15) Low Chroma Saturation Clip Adjustment

Preparation:

The process circuit requires several preadjustments before any actual adjustments can be made.

1. Set the R and B color control knobs to the center, or detent position.
2. Next, set the iris control switch to the auto position.
3. Set the color temperature correction switch to the indoor position (mark: lamp).
4. Set the negative/positive reverse switch to the positive side.
5. Finally, set the standby switch to the operate position.

A test pattern light box will be required for several of the adjustment procedures.
Be sure that the AC voltage (115 ∿ 125V) for the light box is correct and that you are using the correct pattern for each procedure.
If the reflection chart is used, the following light condition is required.

Color Temperature: 3,200°K
Light Intensity: 1,400 ∿ 2,000 lux
(on the chart surface)
Make sure that the correct pattern is used for each step.

(1) COLOR GAMMA CIRCUIT RELEASE

Turn VR321 fully counterclockwise and turn VR311, VR312, VR313, VR314, VR315, VR316, VR317 and VR318 to the center position as shown in Fig. 35.

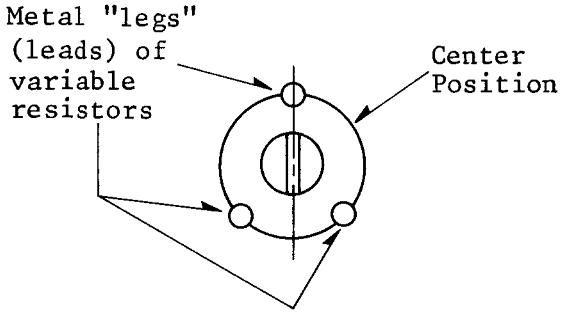
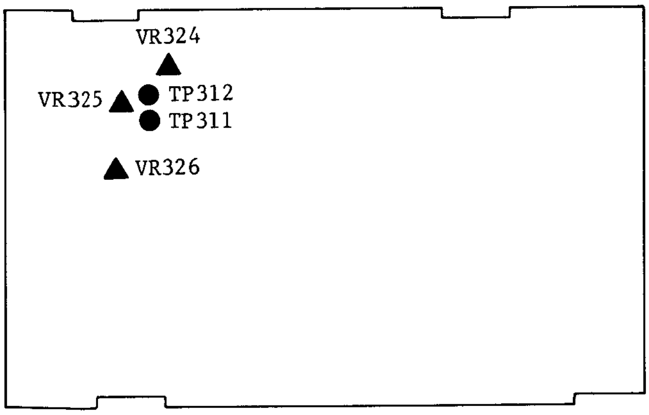


Fig. 35

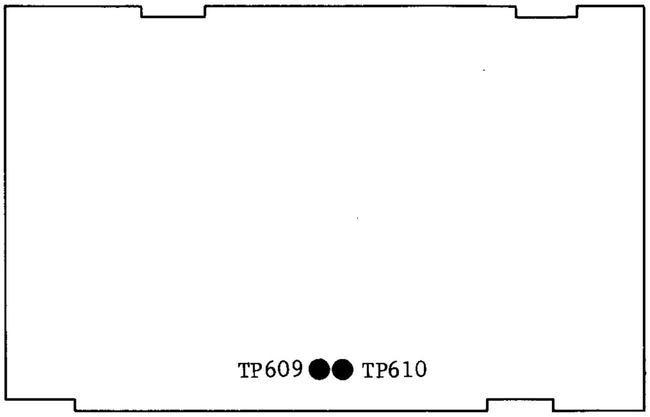
Note:
Adjust each potentiometer from the foil side of circuit board.

(2) VERTICAL EDGE BALANCE ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP312 YL Signal	VR324 Bias Control	Gray Scale	Scope	TP609 HSS
TP311 V-Edge Correction Signal	VR326 V-Edge Gain VR325 V-Edge Bal.			TP610 VSS



Process C.B.A.



Deflection C.B.A.

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to test point TP312 and observe the signal at the horizontal rate.
   Trigger the oscilloscope with test point TP609.
3. Adjust the bias control, VR324, so that the YL signal is maximized, as shown in Fig. 36.

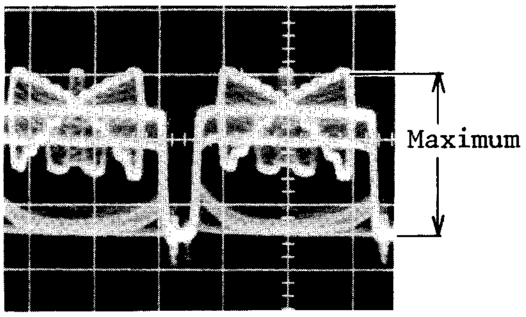
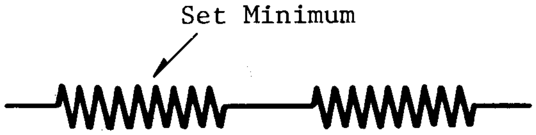
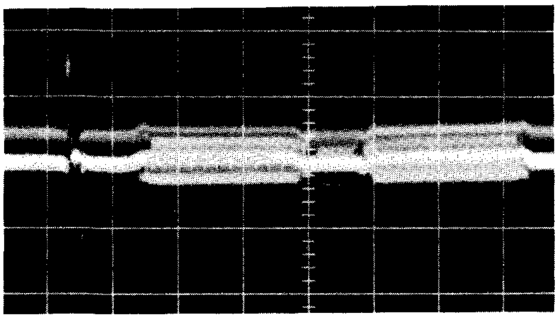


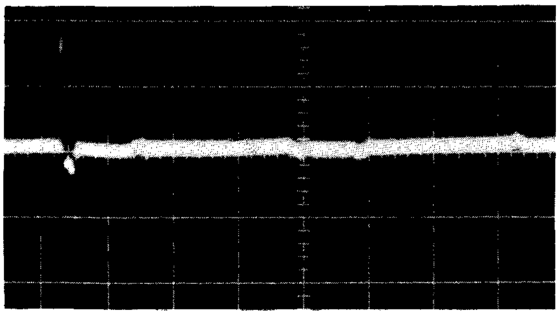
Fig. 36

4. Then, connect the oscilloscope to test point TP311 and observe the vertical edge correction signal at the vertical rate.
   Trigger the oscilloscope with test point TP610.
5. Adjust the vertical edge balance control VR325 so that the vertical edge correction signal is minimized, as shown in Fig. 37.





No Good 20mV 2msec



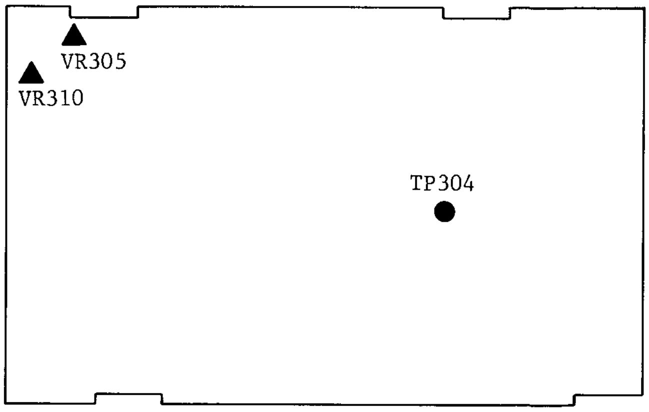
Good 20mV 2msec

Fig. 37 Vertical Edge Correction Signal at TP311

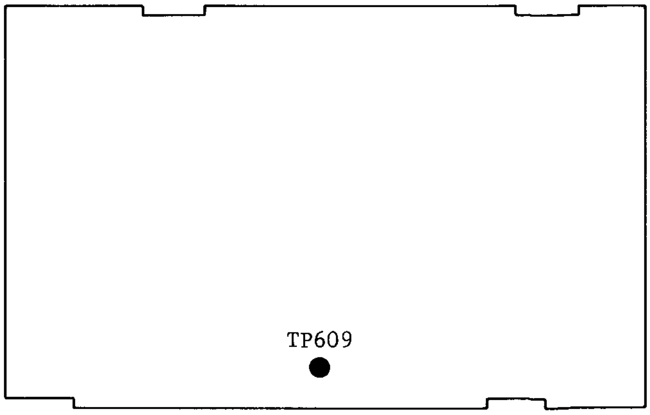
6. Finally, turn the vertical edge gain control, VR326, fully clockwise from the foil side of the circuit board.

(3) RED/BLUE SIGNAL SEPARATION ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP304 Blue Signal	VR305 VR310	Gray Scale	Scope	TP609 HSS



Process C.B.A.



Deflection C.B.A.

1. Set iris control to "Auto".
2. Aim the camera at the gray scale chart.
3. Connect the oscilloscope to test point TP304 and observe the blue signal.
   Trigger the oscilloscope with test point TP609.
4. Alternately adjust the two red & blue separation controls, VR305 and VR310 to minimize the flicker.

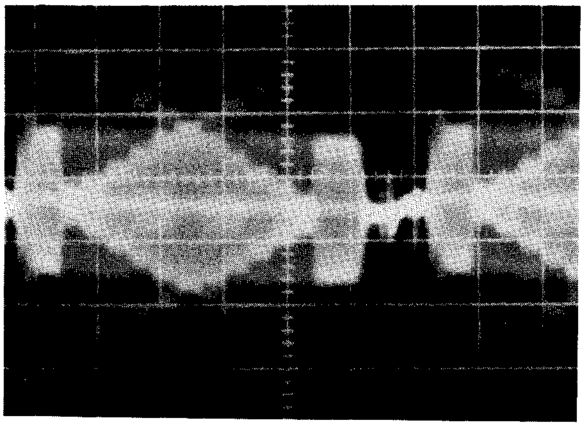
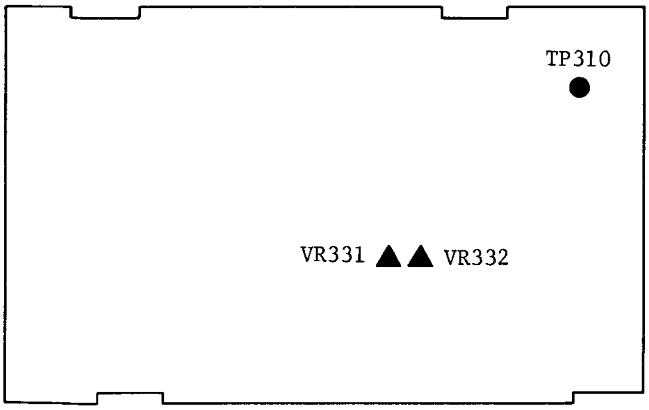


Fig. 38 Blue Signal

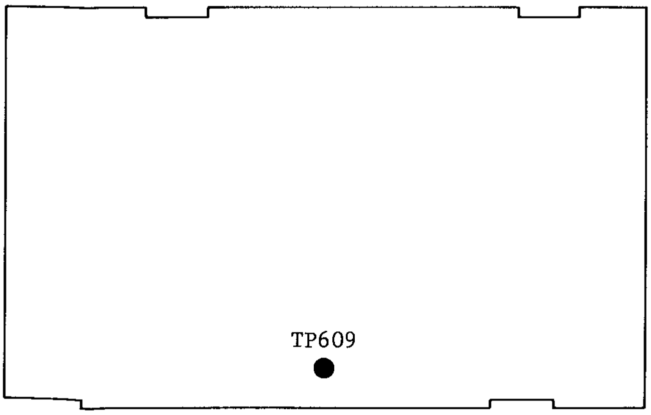
If the blue signal from test point TP304 has red contamination, the waveform will be unstable and have changing amplitude.

(4) CARRIER BALANCE ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP310	VR331 VR332	/	Scope	TP609 HSS



Process C.B.A.



Deflection C.B.A.

1. Set the iris control switch to manual and close the iris.
2. Connect the oscilloscope to test point TP310 and observe the signal at the horizontal rate.
   Trigger the oscilloscope with test point TP609.
3. Alternately adjust the carrier balance controls, VR331 and VR332 until the carrier leakage is minimized.
4. Set iris control to "Auto".

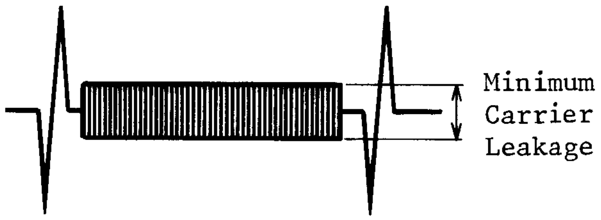
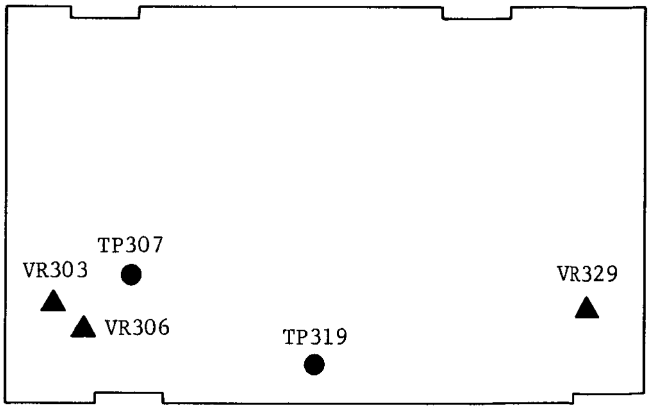


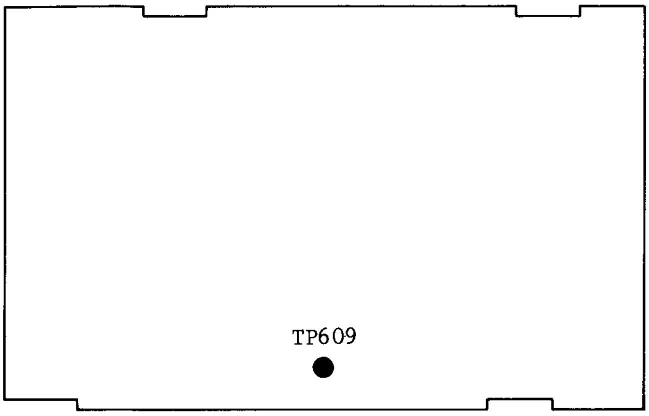
Fig. 39

(5) R AND B GAIN, GAMMA REFERENCE VOLTAGE ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP319 NTSC Signal TP307	VR306 VR329 VR303	Gray Scale	Scope	TP609 HSS



Process C.B.A.



Deflection C.B.A.

Note:

Before proceeding with this adjustment, preset the following camera controls.

a. Set the R and B color control knobs to the center, or detent position.
b. Set the iris control switch to the auto position.
c. Set the color temperature correction switch to the indoor position (lamp side).
d. Turn the power off and wait 5 seconds, to release the automatic white balance control (AWC). Then, turn the power on and confirm the AWC indicator (on EVF) glows red.

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to the test point TP307 and observe the signal at the horizontal rate.
   Trigger the oscilloscope with test point TP609.
3. Adjust the gamma reference voltage control, VR306, so that the signal is clipped at the sixth step from the bottom as shown in Fig. 40.

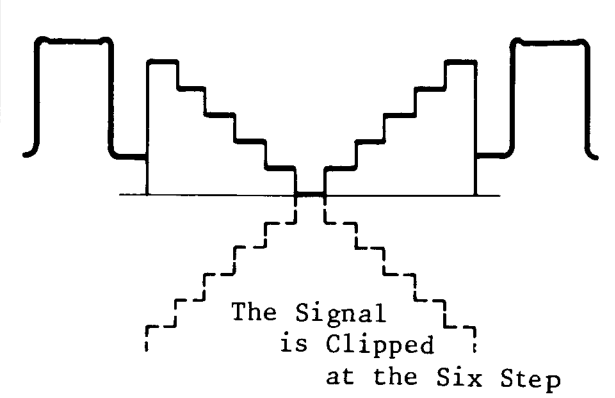


Fig. 40

4. Then, connect the oscilloscope to test point TP319 and observe the NTSC signal at the horizontal rate. Trigger the oscilloscope with test point TP609.
5. Alternately adjust the red gain control VR329, and the chroma gain control VR303, to minimize the carrier leakage at the fourth step through the eighth step from the bottom.

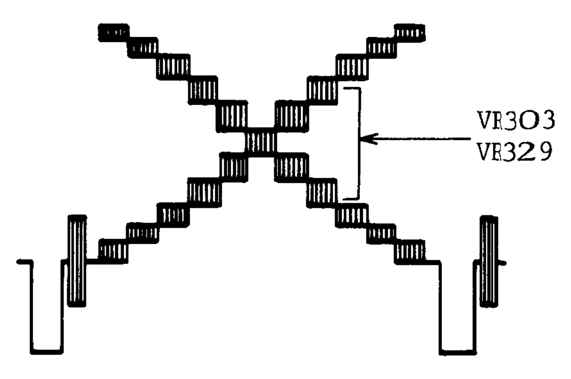
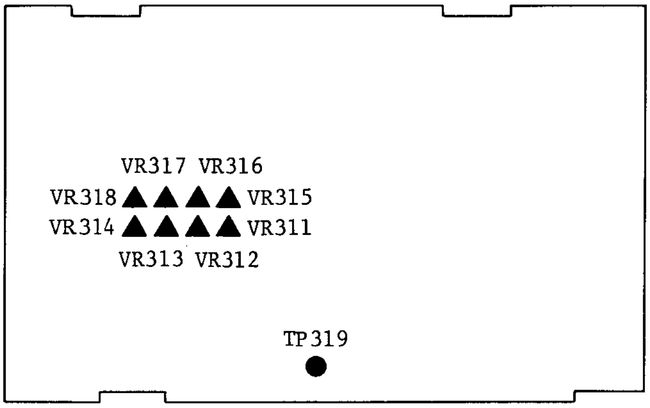


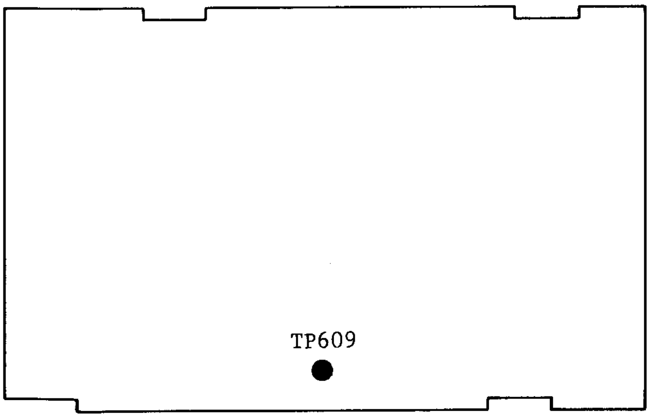
Fig. 41 NTSC Signal

(6) R AND B GAMMA ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP319 NTSC Signal	VR318 R-Gamma 1 VR314 B-Gamma 1 VR317 R-Gamma 2 VR313 B-Gamma 2 VR316 R-Gamma 3 VR312 B-Gamma 3 VR315 R-Gamma 4 VR311 B-Gamma 4	Gray Scale	Scope	TP609 HSS



Process C.B.A.



Deflection C.B.A.

1. Aim the camera at the gray scale chart.
2. Connect the oscilloscope to test point TP319 and observe the NTSC signal at the horizontal rate. Trigger the oscilloscope with test point TP609.
3. Adjust Red Gamma 1 Control, VR318 and Blue Gamma 1 Control, VR314 until the carrier leakage from the bottom through third steps is minimized.
4. Alternately adjust the red gain control VR329, and the chroma gain control VR303, to minimize the carrier leakage at the fourth step through the eighth step from the bottom.
5. Adjust Red Gamma 2 Control VR317 and Blue Gamma 2 Control VR313 until the carrier leakage from third through fifth step from the top is minimized.
6. Zoom the lens out so that the black edge of the chart is visible in the picture. This increases the chart luminance which makes adjustment easier.
7. Then, adjust Red Gamma 3 Control VR316 and Blue Gamma 3 Control VR312, until the carrier leakage from the first through third step from the top is minimized.
8. Adjust Red Gamma 4 Control VR315 and Blue Gamma 4 Control VR311, until the carrier leakage from the first through third step from top is minimized.

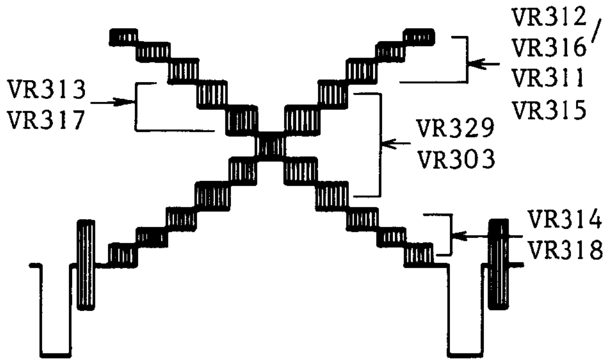


Fig. 42 NTSC Waveform

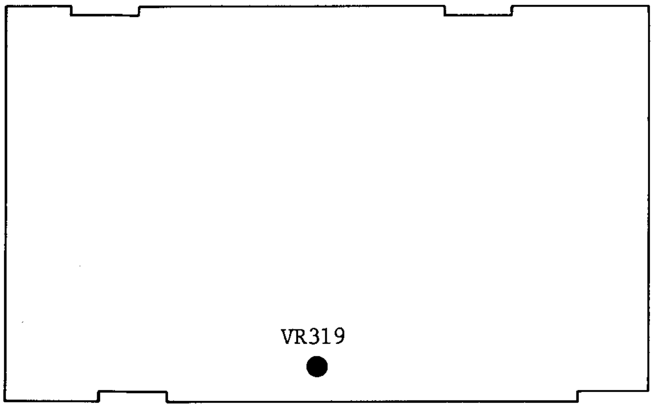
It is normal to have some residual carrier leakage, particularly at the top steps of the waveform. How much is normal depends on the characteristic of the newvicon.

(7) WHITE BALANCE FINE ADJUSTMENT

Repeat (5) R and B gain adjustment and (6) R and B gamma adjustment.

(8) HIGH LUMINANCE CHROMA CLIP ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
/	VR319 H.C. Gain	Gray Scale	Color Monitor	/



Process C.B.A.

1. Aim the camera at the gray scale chart and observe the picture on the TV monitor.
2. Next, zoom out to 12mm and check the high luminance part of the scale, from the whitest step to the fourth step from white.
   The picture should be whitish-gray.
3. If, however, the picture has a green or yellow cast, adjust the High Luminance Chroma Clip Gain Control VR319, until the cast is eliminated and the picture is a normal whitish-gray.

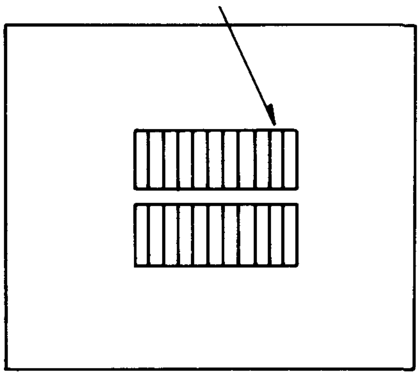

High Luminance Parts
Should Show no Color
When Adjustment by VR319

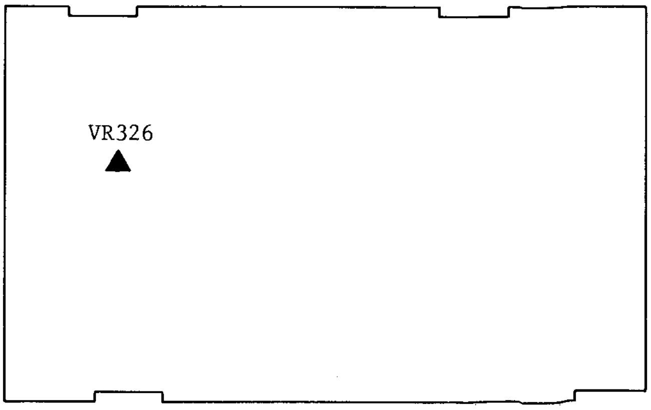
Fig. 43

(9) CONFIRMATION OF THE NTSC PEDESTAL ADJUSTMENT

Check NTSC pedestal adjustment and NTSC signal level adjustment, step (6) (See deflection circuit adjustment flow chart.), and adjust it if necessary. If the adjustment is correct, go on to the next step.

(10) VERTICAL EDGE GAIN ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
/	VR326 V. Edge Gain	Gray Scale	Color Monitot	/



Process C.B.A.

1. Aim the camera at the gray scale chart.
2. Observe the picture on the monitor and adjust Vertical Edge Gain Control VR326 until the color fringing on the upper and lower edges of the gray scale is eliminated.

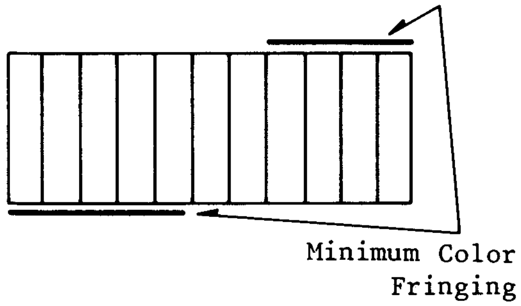
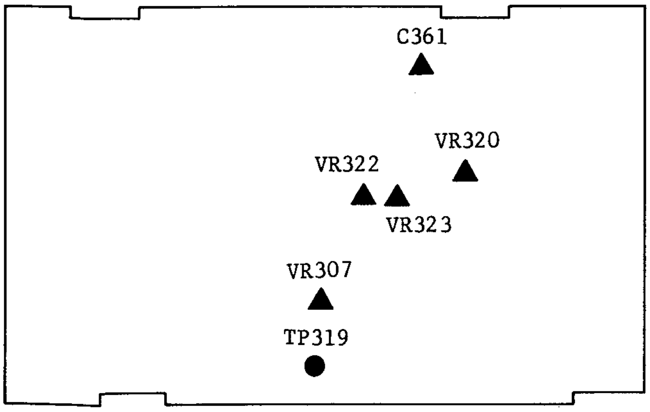


Fig. 44 Picture of Gray-Scale

(11) COLOR SIGNAL ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP319 NTSC Signal	VR307 Color Gain VR320 R-Y Gain VR322 BF Phase C361 B-Y Phase VR323 Negative BF Phase	Color Bar Chart	Vectorscope	/



Process C.B.A.

Note:

Before beginning this adjustment, check to see that the automatic white balance control indicator in the camera's electronic viewfinder glows green.
If it doesn't, adjust White Balance Control until it does glow green.

1. Aim the camera at the color bar chart.
2. Connect the vectorscope to test point TP319.
3. Set the vectorscope to "Vector" mode and observe the color vector.
4. Adjust the color gain control VR307, so that the amplitude of the YL signal is 1.2 times the amplitude of the burst signal.
5. Adjust the R-Y gain control VR320, so that the amplitude of the red signal is 1.5 times the amplitude of the burst signal.
6. Adjust the burst flag phase control VR322, (BF Phase), so that the vector phase of the red signal is 104° ± 15°.
7. Adjust the B-Y phase control C361 so that YL signal is $168^{\circ}\,{}^{+10^{\circ}}_{-30^{\circ}}$.
8. Adjust the total amplitude and the total phase with VR307, VR320, VR322 and C361 to be within specification as shown in chart-1.
9. Turn the negative/positive reverse switch to the negative side, and adjust the negative BF phase control VR323 so that the vector phase of the red signal is 284°.

Specification:

1) Phase

Signal	Vector Phase	Adj.
R	104° ± 15°	VR322
YL	$168^{\circ}\,^{+10^{\circ}}_{-30^{\circ}}$	C361
R (Negative)	290°	VR323

2) Amplitude

a. The amplitude of R signal is 1.5 times the burst signal.
b. The amplitude of YL signal is 1.2 times the burst signal.

Chart-1.

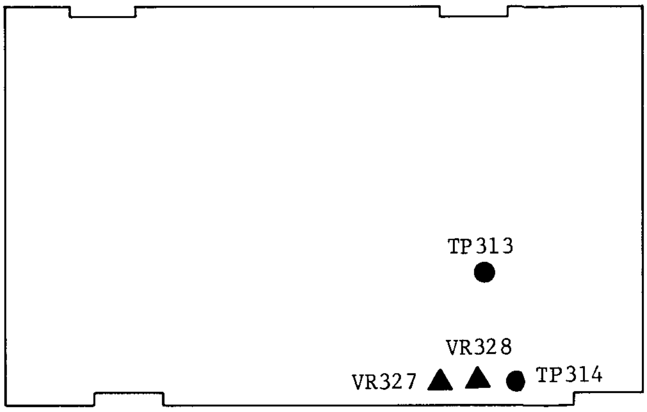
(12) CONFIRMATION OF RESOLUTION

1. Shoot the Resolution Chart. Frame it completely.
2. While viewing the Resolution Chart on the EVF confirm that the horizontal resolution is approximately 300 lines.

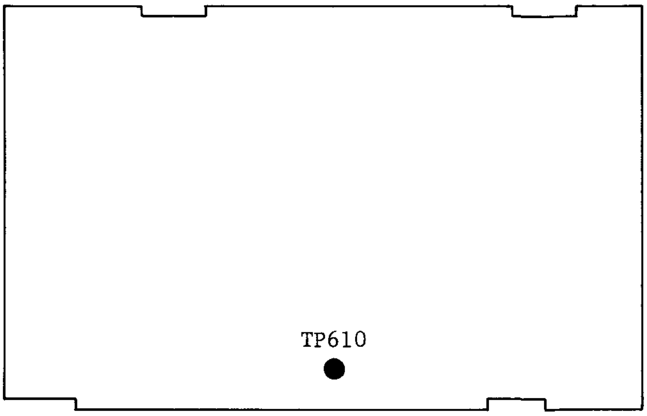
(13) AWC (AUTOMATIC WHITE BALANCE CONTROL) ADJUSTMENT

A. Method 1

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP313 B-Y Comparator Signal	VR328	Gray Scale	Scope	TP610 VSS
TP314 R-Y Comparator Signal	VR327			

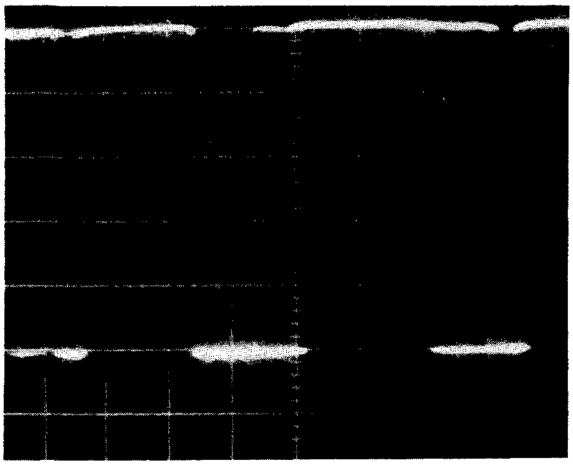


Process C.B.A.



Deflection C.B.A.

1. Turn the power off and wait 5 seconds for the automatic white balance control (AWC) to be released, then turn the power back on.
2. Confirm that the automatic white balance control indicator glows red.
3. Aim the camera at the gray scale chart.
4. See if the color balance is correct by checking for color in the picture.
   The color balance is correct if there is no color in the picture.
5. Now connect the oscilloscope to test point TP313 and observe the waveform at the vertical rate.
   Trigger the oscilloscope with test point TP610.
6. Place the oscilloscope in the DC mode.
7. Adjust Automatic White Balance Control VR328 so that the signal becomes as shown below.



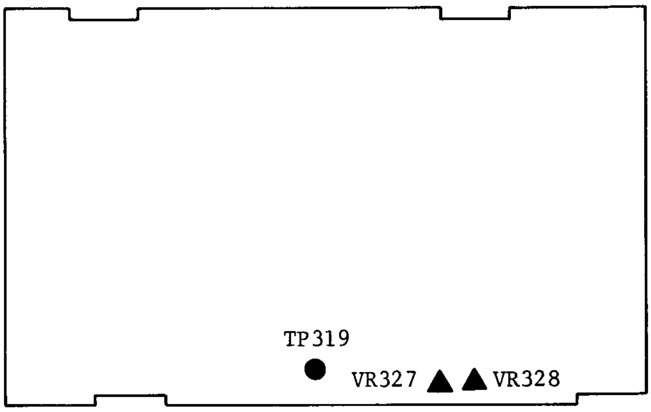
1V 5msec

Fig. 45

8. Connect the oscilloscope to test point TP314 and observe the waveform at the vertical rate.
9. Adjust Automatic White Balance Control VR327 in the same manner.
10. Aim the camera at the white chart and confirm that the white balance is correct when the automatic white balance control switch is set to the "ON" position.
11. Set the color temperature correction switch to the outdoor position. Then, set the AWC switch to the "ON" position, and confirm that the AWC indicator glows red.
12. Aim the camera at the low illumination object (less than 50 lux). Then, set the AWC switch to the "ON" position, and confirm that the AWC indicator glows red.

B. Method 2

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP319 NTSC Signal	VR327 VR328	White	Vector-scope	

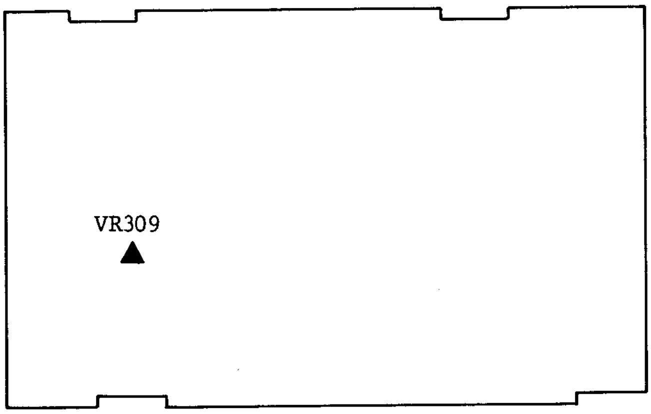


Process C.B.A.

1. Turn the power off and wait 5 seconds for the automatic white balance control (AWC) to be released, then turn the power back on.
2. Confirm that the automatic white balance control indicator glows red.
3. Aim the camera at a white chart.
4. Connect the vectorscope to test point TP319, and then set the vectorscope to the "Vector" mode.
5. Set the automatic white balance control switch to the "ON" position.
6. Observe the vectorscope screen, and alternately adjust the automatic white balance controls VR327 and VR328 so that the white balance point is in the center of the vectorscope screen.

(14) REMAINING IMAGE ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
/	VR309	/	Color Monitor	/



Process C.B.A.

1. Aim the camera at the metronome.
2. Adjust VR309 so that the remaining image of the pendulum is minimized.

Note:
If the adjustment is performed incorrectly, either Magenta or Green color appears as the remaining image in the white portion.

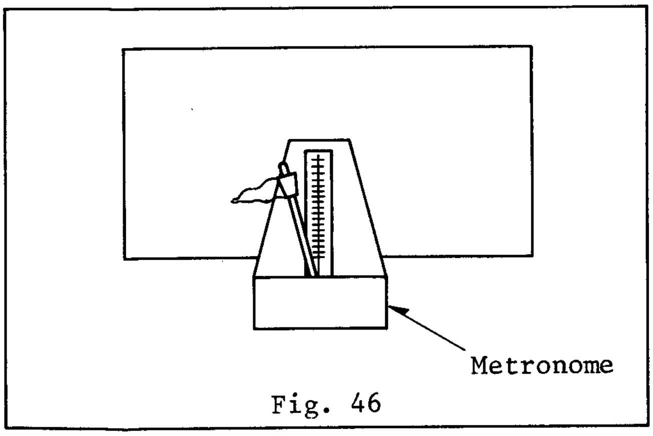
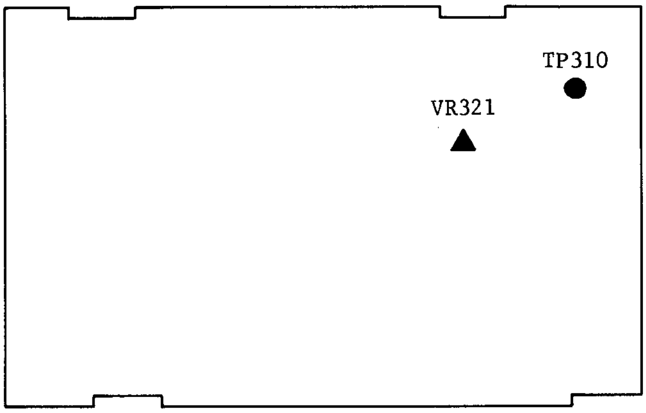


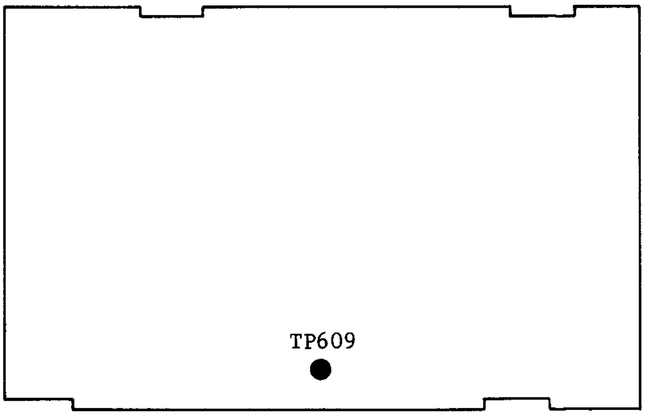
Fig. 46

(15) LOW CHROMA SATURATION CLIP ADJUSTMENT

TP	Adj.	Chart	Test Instrument	Scope Trigger
TP310	VR321	Grsy Scale	Scope	TP609 HSS

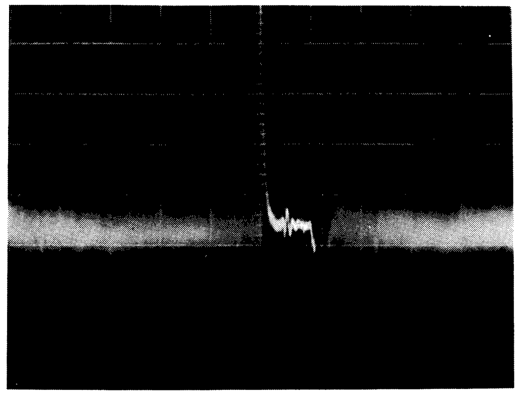


Process C.B.A.

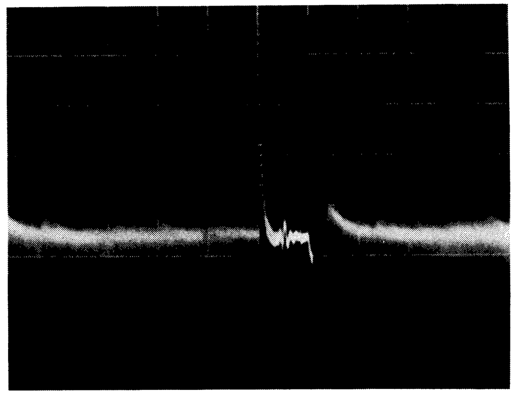


Deflection C.B.A.

1. Aim the camera at the gray scale chart.
2. Set the automatic white balance control switch to the "ON" position.
3. Connect the oscilloscope to test point TP310 and observe the signal at the horizontal rate.
   Trigger the oscilloscope with test point TP609.
4. Adjust VR321 until the clipped line appears on the waveform.



(a) Befor Adjustment



(b) After Adjustment

Fig. 47

5. Aim the camera at a normal object, and confirm that the low chroma saturation clip is correct.

[4] ELECTRONIC VIEWFINDER CIRCUIT

Preparation:

Connect the viewfinder connector to the EVF connector on the camera head.

(1) HORIZONTAL FREQUENCY ADJUSTMENT

1. Turn the power switch on.
2. Aim the camera at the test pattern.
3. Short pin-4 and pin 5 of connector P609 using a jumper.
4. Connect a 10:1 frequency counter probe to pin-22 of IC603.
5. Adjust VR616 so that the frequency counter indicates $15.760^{+0.020}_{-0}$ Hz.
6. Remove the jumper connected between pin-4 and pin-5 of connector P609.
7. Confirm that the horizontal scanning is stable. If not, readjust VR616.
8. If the horizontal picture center is improperly positioned, adjust the center ring on the deflection coil assembly.
9. If the brightness is incorrect, adjust VR901 (brightness).

(2) VERTICAL HEIGHT

1. Aim the camera at the registration chart.
2. Adjust VR618 so the circle is symmetrically round.

(3) FOCUS

1. Aim the camera at the registration chart.
2. If the focus on viewfinder is improper but the picture on the monitor is OK, adjust VR902.

(4) IRIS INDICATOR ADJUSTMENT

1. Aim the camera at the gray scale chart.
   If a reflection type gray scale chart is used, a light intensity above 1,000 lux will be required on the chart surface.
2. Set the iris control switch to auto.
3. Adjust VR617 so that the iris indicator is in the center position.

[5] CAMERA REMOTE CONTROL CIRCUIT

(1) DISPLAY POSITION ADJUSTMENT

1. Set the iris control switch to the manual and close the iris.
2. Set the standby switch to "OPERATE 1" position.
3. Next, set the Display Select Switch to the "TITLE" position, and display characters on one row.
4. Adjust VR701 so that characters are displayed as shown below.
   (a = b)

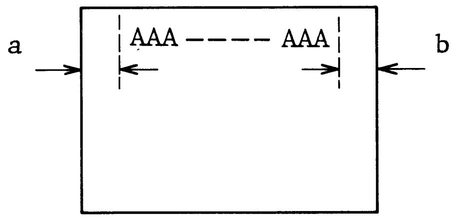
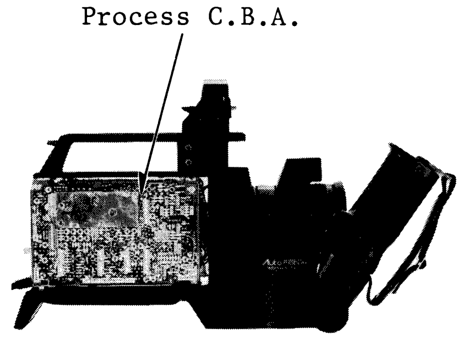


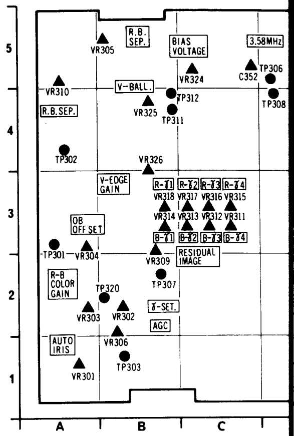
Fig. 48 TV Screen

Location of Test Points a

Process C.B.A.

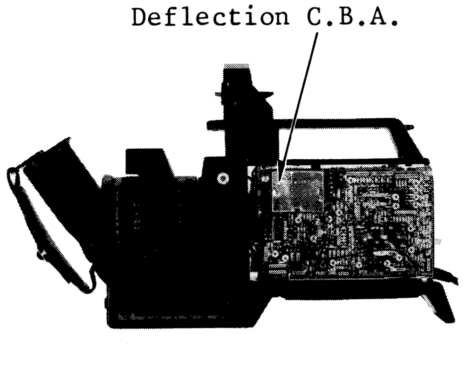
VEPW0188

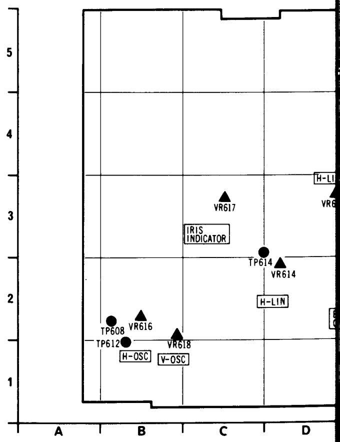

Process C.B.A.

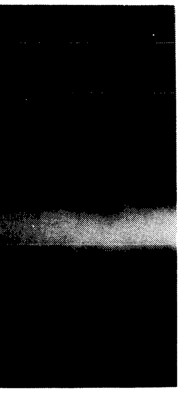

R.B. SEP.
VR305
BIAS VOLTAGE
3.58MHz
VR324
C352
TP306
VR310
V-BALL.
TP312
TP308
R.B.SEP.
VR325
TP311
TP302
VR326
V-EDGE GAIN
R-γ1
R-γ2
R-γ3
R-γ4
VR318
VR317
VR316
VR315
VR314
VR313
VR312
VR311
OB OFF SET
B-γ1
B-γ2
B-γ3
B-γ4
TP301
VR304
VR309
RESIDUAL IMAGE
R-B COLOR GAIN
TP320
TP307
VR303
VR302
γ-SET.
AGC
AUTO IRIS
VR306
VR301
TP303
5
4
3
2
1
A
B
C

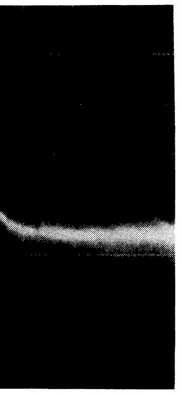
Deflection C.B.A.

VEPW0189


Deflection C.B.A.


H-LI
VR617
VR6
IRIS INDICATOR
TP614
VR614
H-LIN
TP608
VR616
TP612
VR618
H-OSC
V-OSC
5
4
3
2
1
A
B
C
D





ormal object,
low chroma
rrect.

[4] ELECTRONIC VIEWFINDER CIRCUIT

Preparation:

Connect the viewfinder connector to the EVF connector on the camera head.

(1) HORIZONTAL FREQUENCY ADJUSTMENT

1. Turn the power switch on.
2. Aim the camera at the test pattern.
3. Short pin-4 and pin 5 of connector P609 using a jumper.
4. Connect a 10:1 frequency counter probe to pin-22 of IC603.
5. Adjust VR616 so that the frequency counter indicates $15.760^{+0.020}_{-0}$ Hz.
6. Remove the jumper connected between pin-4 and pin-5 of connector P609.
7. Confirm that the horizontal scanning is stable. If not, readjust VR616.
8. If the horizontal picture center is improperly positioned, adjust the center ring on the deflection coil assembly.
9. If the brightness is incorrect, adjust VR901 (brightness).

(2) VERTICAL HEIGHT

1. Aim the camera at the registration chart.
2. Adjust VR618 so the circle is symmetrically round.

(3) FOCUS

1. Aim the camera at the registration chart.
2. If the focus on viewfinder is improper but the picture on the monitor is OK, adjust VR902.

(4) IRIS INDICATOR ADJUSTMENT

1. Aim the camera at the gray scale chart.
   If a reflection type gray scale chart is used, a light intensity above 1,000 lux will be required on the chart surface.
2. Set the iris control switch to auto.
3. Adjust VR617 so that the iris indicator is in the center position.

[5] CAMERA REMOTE CONTROL CIRCUIT

(1) DISPLAY POSITION ADJUSTMENT

1. Set the iris control switch to the manual and close the iris.
2. Set the standby switch to "OPERATE 1" position.
3. Next, set the Display Select Switch to the "TITLE" position, and display characters on one row.
4. Adjust VR701 so that characters are displayed as shown below.
   (a = b)

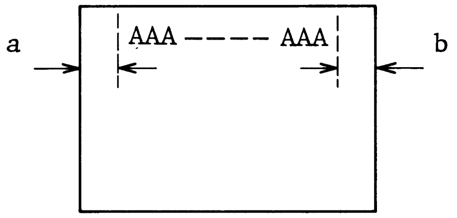
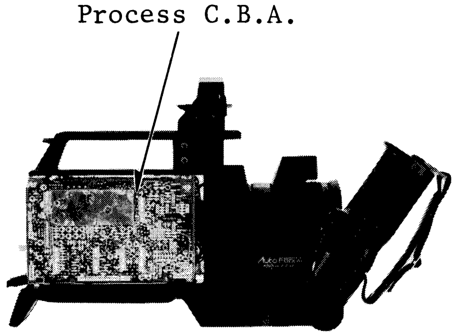


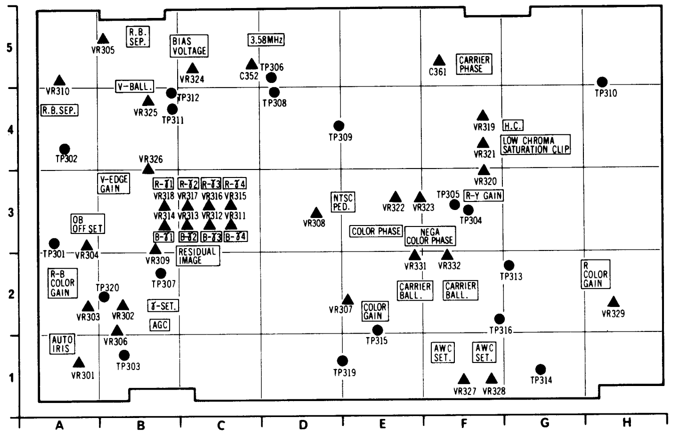
Fig. 48 TV Screen

Location of Test Points and Controls

Process C.B.A.

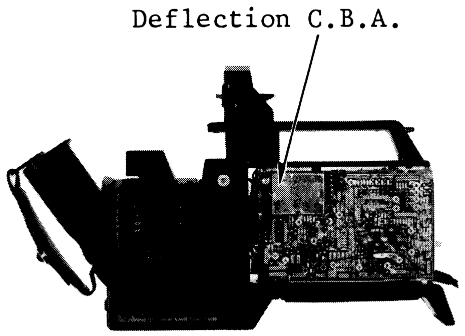
VEPW0188

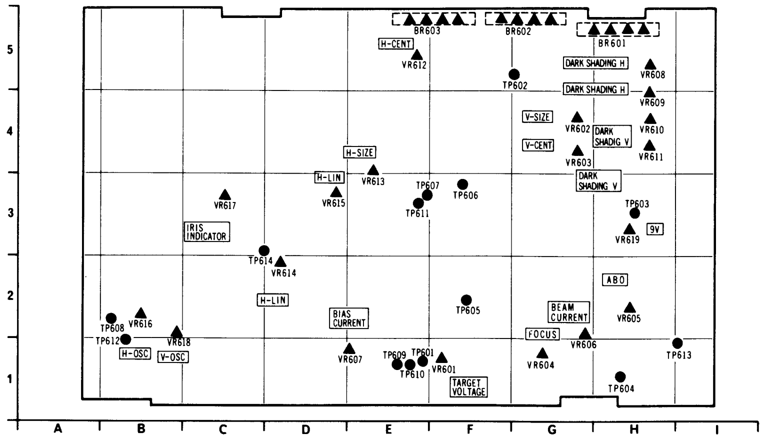

Process C.B.A.


R.B. SEP.
BIAS VOLTAGE
3.58MHz
VR305
VR310
V-BALL.
VR324
C352
TP306
TP308
TP312
VR325
TP311
R.B.SEP.
C361
CARRIER PHASE
TP310
TP309
VR319
H.C.
VR321
LOW CHROMA SATURATION CLIP
TP302
VR326
VR320
V-EDGE GAIN
R-γ1
R-γ2
R-γ3
R-γ4
VR318
VR317
VR316
VR315
VR314
VR313
VR312
VR311
B-γ1
B-γ2
B-γ3
B-γ4
OB OFF SET
NTSC PED.
VR308
VR322
VR323
TP305
R-Y GAIN
TP304
COLOR PHASE
NEGA COLOR PHASE
TP301
VR304
VR309
RESIDUAL IMAGE
VR331
VR332
TP313
R COLOR GAIN
R-B COLOR GAIN
TP320
TP307
CARRIER BALL.
CARRIER BALL.
VR303
VR302
γ-SET.
VR307
COLOR GAIN
VR329
AGC
TP316
AUTO IRIS
VR306
TP315
AWC SET.
AWC SET.
VR301
TP303
TP319
VR327
VR328
TP314
1
2
3
4
5
A
B
C
D
E
F
G
H

Deflection C.B.A.

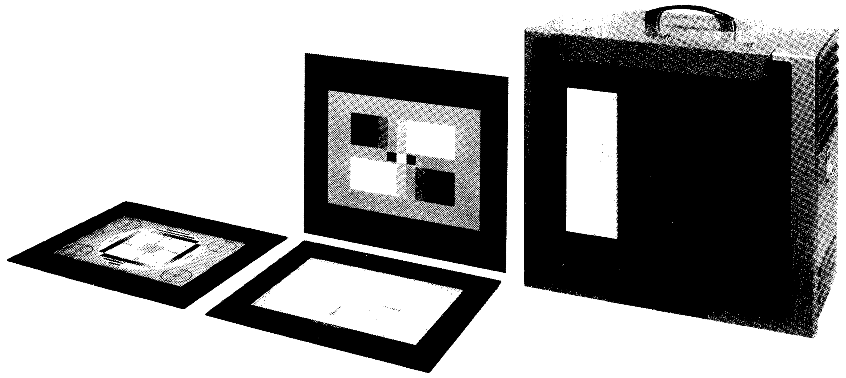
VEPW0189


Deflection C.B.A.

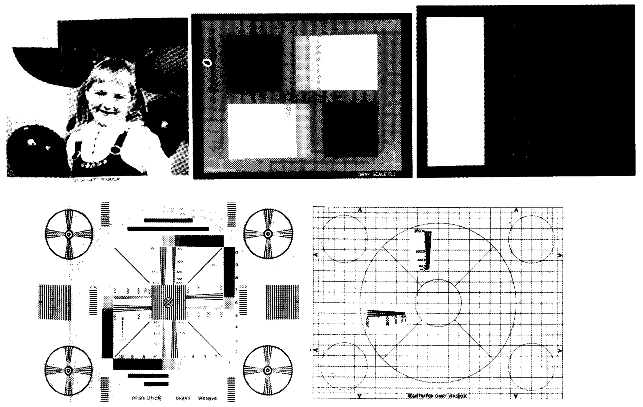

BR603
BR602
BR601
H-CENT
VR612
DARK SHADING H
VR608
TP602
DARK SHADING H
VR609
V-SIZE
VR602
DARK SHADIG V
VR610
V-CENT
VR603
VR611
H-SIZE
H-LIN
VR613
DARK SHADING V
VR615
TP607
TP606
VR617
TP611
TP603
IRIS INDICATOR
VR619
9V
TP614
VR614
ABO
H-LIN
TP605
BEAM CURRENT
VR605
BIAS CURRENT
TP608
VR616
TP612
VR618
FOCUS
VR606
TP613
H-OSC
V-OSC
VR607
TP609
TP601
VR601
TP610
VR604
TARGET VOLTAGE
TP604
1
2
3
4
5
A
B
C
D
E
F
G
H
I

COLOR CAMERA SERVICING FIXTURES

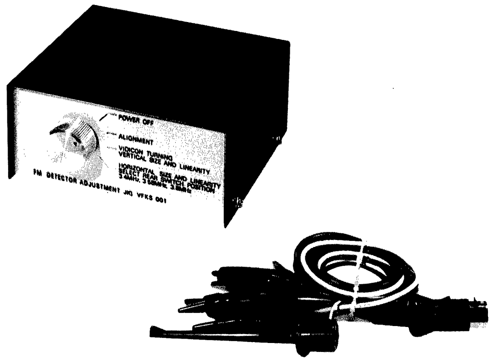
LIGHT BOX w/CHART SET VFKS002



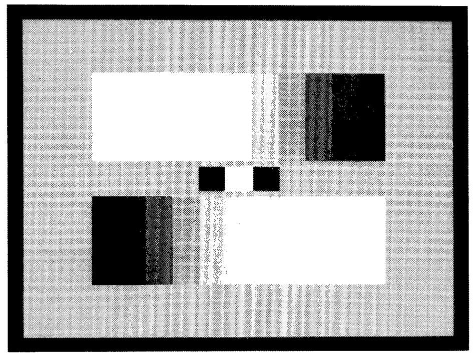
REFLECTION CHART SET VFKS003



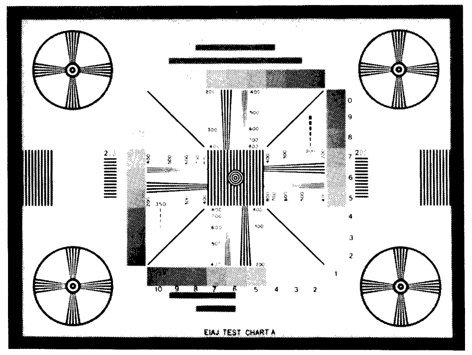
FM DETECTOR VFKS001


POWER OFF
ALIGNMENT
VIDICON TURNING
VERTICAL SIZE AND LINEARITY
HORIZONTAL SIZE AND LINEARITY
SELECT REAR SWITCH POSITION
FM DETECTOR ADJUSTMENT JIG VFKS 001

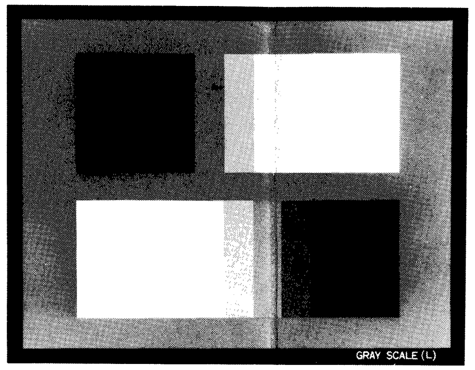
GRAY SCALE CHART VFKS002A



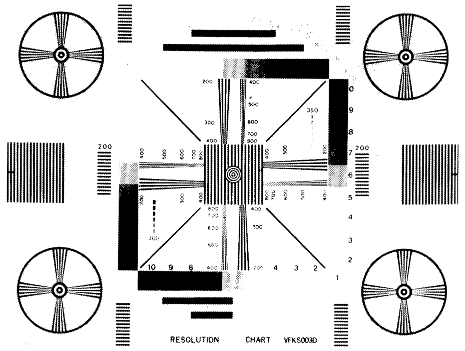
RESOLUTION CHART VFKS002D


EIAJ TEST CHART A

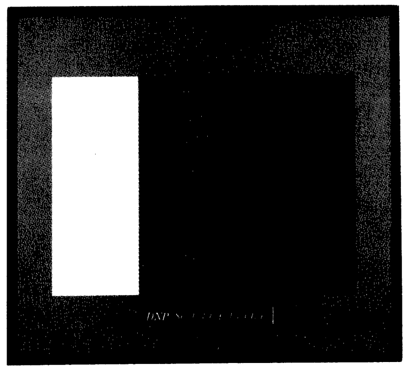
GRAY SCALE CHART VFKS003A


GRAY SCALE (L)

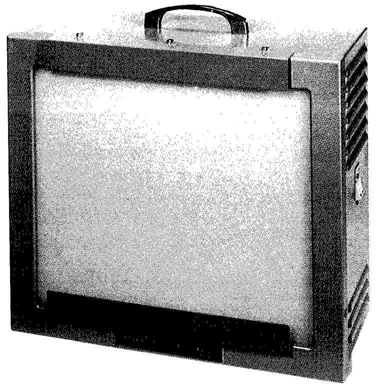
RESOLUTION CHART VFKS003D


RESOLUTION CHART VFKS003D

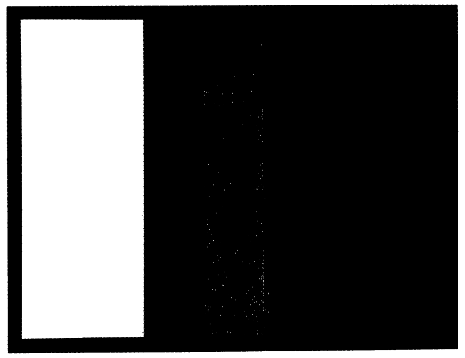
COLOR CHART VFKS002B



LIGHT BOX VFKS002Y



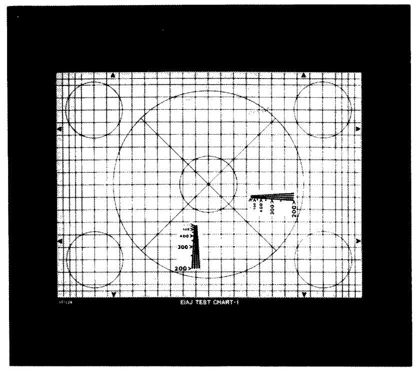
COLOR CHART VFKS003B



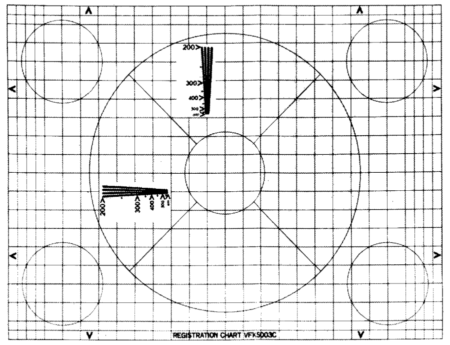
COLOR SHEET VFKS003E

COLOR SHEET VFKS003E

REGISTRATION CHART VFKS002C


EIAJ TEST CHART-I

REGISTRATION CHART VFKS003C


REGISTRATION CHART VFKS003C

ORDER NO. VRD-8303-372

Service Manual

Color Video Camera

PK-957

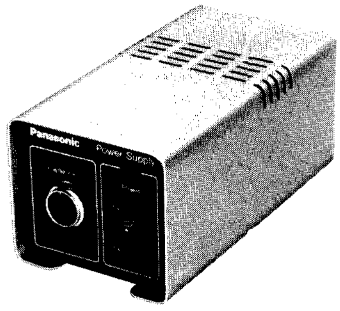
Power Supply Unit

PK-A789S

Vol. 3

Block Diagrams

PK-957



PK-A789S

SPECIFICATIONS:

Power Source:	DC 12V ± 10% AC 120V ± 10%, 60Hz ± 0.5% (with Power Supply Unit)
Power Consumption: (with E.V.F)	DC 6.6W at 12V DC (Battery) DC 2.0W at standby
Newvicon Tube System:	2/3″ frequency separation single tube system (built-in stripe filter)
Single Carrier Frequency:	5MHz
Focus System:	Electro-static type
Lens Mounting:	Built-in zoom lens (not "C" mount)
Lens:	8:1 zoom lens with auto/manual iris control. Auto zoom lens and macro construction F: 1.6, f: 12—96mm d: 1.2m to infinity
Lens Diameter:	58mm
Light Sensitivity:	Minimum light intensity on optical image: 10 Lux (F: 1.4) Optimum light intensity on optical image: 900 Lux
Video Output Level:	1.0Vp-p, 75Ω (M type coaxial connector) (Standard NTSC signal)
Sync. System:	Internal Sync.: RS-170
Signal to Noise Ratio:	More than 45dB
Horizontal Resolution:	300 lines

Color Temperature Control:	2 step switch (indoor/outdoor) & auto adjust
Microphone:	Built-in stereo microphone
Audio Output Level:	−20dB, Hi-impedance
Audio Output Impedance:	High impedance (1KΩ)
External Microphone Input Impedance: (Left, Right)	600Ω unbalanced
Electronic Viewfinder:	Monochrome 1 inch CRT
Operating Temperature:	5°C to 40°C
Operating Humidity:	10% to 75%
Operating Position:	Normal position only
Weight:	Camera Head with E.V.F. 5.5 lbs (with lens, 7ft cable & shoulder pad/handle grip) AC adaptor (option) 2.4 lbs
Dimensions:	Camera Head with E.V.F. 8.3″(W) × 8.7″(H) × 11.8″(D) 208mm(W) × 218mm(H) × 296mm(D) AC adaptor (option) 3″(W) × 3″(H) × 6″(D) 79mm(W) × 75mm(H) × 149mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

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of Canada Limited
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Ontario, L4W 2T3

Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico Inc.
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Victoria Industrial Park
Carolina, Puerto Rico 00630

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PROCESS BLOCK DIAGRAM 3-3

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(4) Fade Mode 3-7

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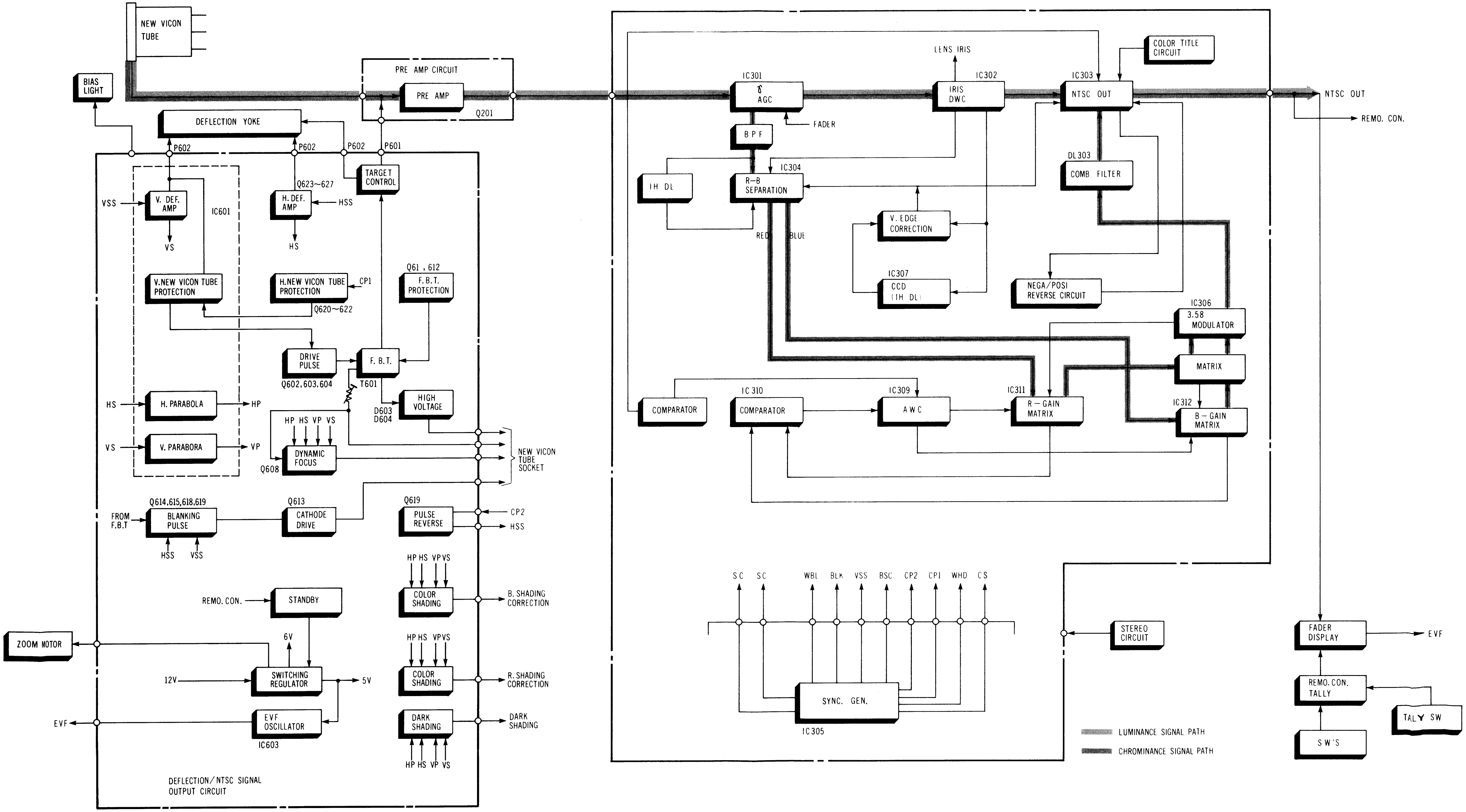
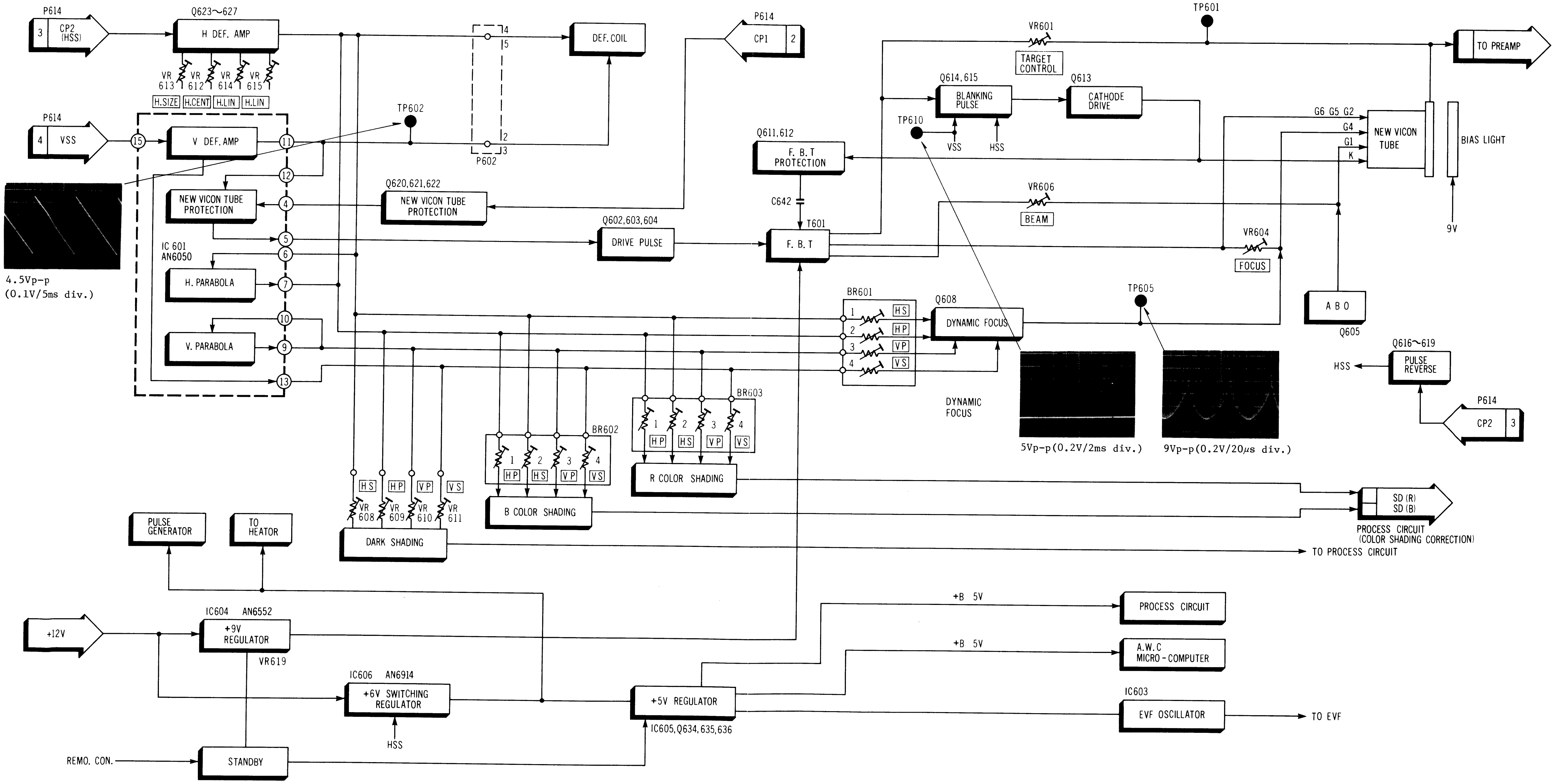
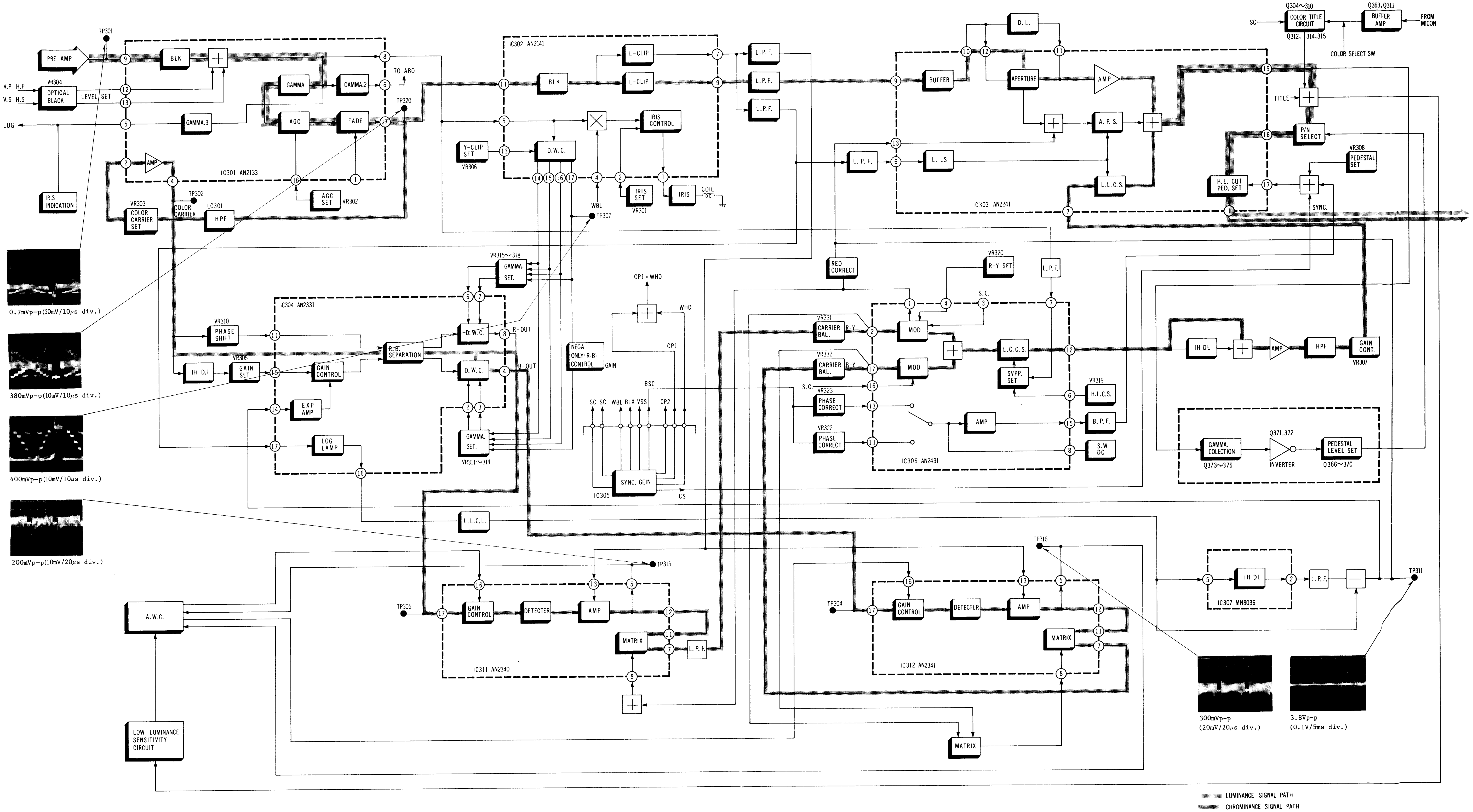
OVERALL BLOCK DIAGRAM


NEW VICON TUBE
BIAS LIGHT
PRE AMP CIRCUIT
PRE AMP
Q201
DEFLECTION YOKE
P602
P602
P602
P601
TARGET CONTROL
VSS
V. DEF. AMP
VS
IC601
Q623~627
H. DEF. AMP
HSS
HS
V.NEW VICON TUBE PROTECTION
H.NEW VICON TUBE PROTECTION
CP1
Q620~622
Q61 , 612
F.B.T. PROTECTION
DRIVE PULSE
Q602,603,604
F. B. T.
T601
HIGH VOLTAGE
D603
D604
HS
H. PARABOLA
HP
HP HS VP VS
VS
V. PARABORA
VP
DYNAMIC FOCUS
Q608
NEW VICON TUBE SOCKET
Q614,615,618,619
FROM F.B.T
BLANKING PULSE
HSS
VSS
Q613
CATHODE DRIVE
Q619
PULSE REVERSE
CP2
HSS
HP HS VP VS
REMO. CON.
STANDBY
COLOR SHADING
B. SHADING CORRECTION
ZOOM MOTOR
6V
HP HS VP VS
12V
SWITCHING REGULATOR
5V
COLOR SHADING
R. SHADING CORRECTION
EVF
EVF OSCILLATOR
IC603
DARK SHADING
DARK SHADING
HP HS VP VS
DEFLECTION/NTSC SIGNAL OUTPUT CIRCUIT
LENS IRIS
IC301
γ AGC
FADER
IC302
IRIS DWC
IC303
NTSC OUT
COLOR TITLE CIRCUIT
NTSC OUT
REMO. CON.
BPF
IC304
IH DL
R–B SEPARATION
RED
BLUE
DL303
COMB FILTER
V. EDGE CORRECTION
IC307
CCD (IH DL)
NEGA/POSI REVERSE CIRCUIT
IC306
3.58 MODULATOR
MATRIX
COMPARATOR
IC 310
COMPARATOR
IC309
AWC
IC311
R – GAIN MATRIX
IC312
B – GAIN MATRIX
SC
SC
WBL
BLK
VSS
BSC
CP2
CP1
WHD
CS
SYNC. GEN.
IC305
STEREO CIRCUIT
LUMINANCE SIGNAL PATH
CHROMINANCE SIGNAL PATH
FADER DISPLAY
EVF
REMO. CON. TALLY
TALLY SW
SW'S

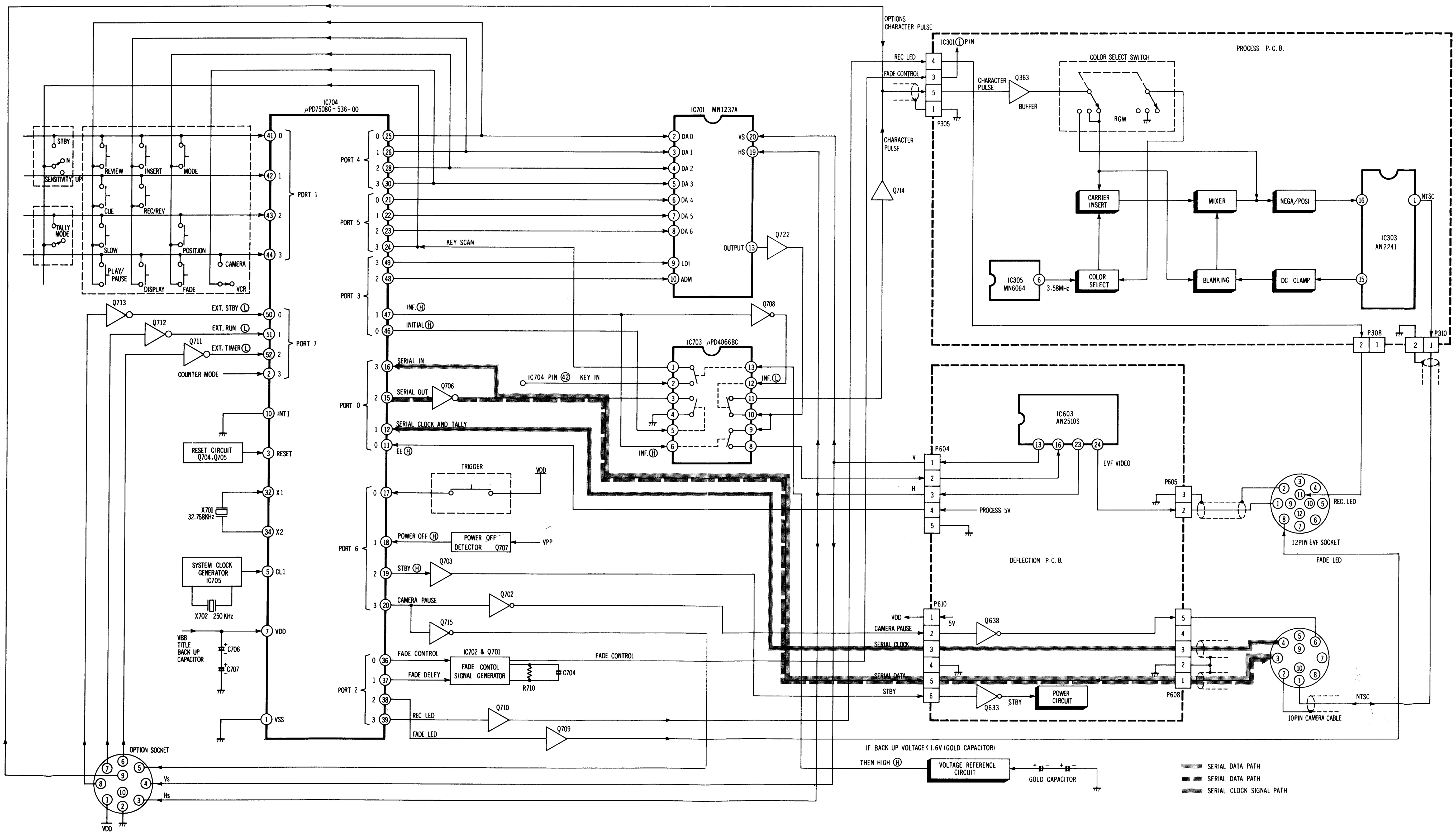
DEFLECTION BLOCK DIAGRAM


P614
3 CP2 (HSS)
Q623~627
H DEF. AMP
VR 613
VR 612
VR 614
VR 615
H.SIZE
H.CENT
H.LIN
H.LIN
P614
4 VSS
15
V DEF. AMP
11
12
4
5
6
7
10
9
13
TP602
NEW VICON TUBE PROTECTION
IC 601 AN6050
H. PARABOLA
V. PARABOLA
4.5Vp-p
(0.1V/5ms div.)
4
5
2
3
P602
DEF. COIL
P614
CP1 2
Q620,621,622
NEW VICON TUBE PROTECTION
Q602,603,604
DRIVE PULSE
Q611,612
F. B. T PROTECTION
C642
T601
F. B. T
TP610
VR601
TARGET CONTROL
Q614,615
BLANKING PULSE
VSS
HSS
Q613
CATHODE DRIVE
TP601
TO PREAMP
G6 G5 G2
G4
G1
K
NEW VICON TUBE
BIAS LIGHT
9V
VR606
BEAM
VR604
FOCUS
A B O
Q605
BR601
1 HS
2 HP
3 VP
4 VS
Q608
DYNAMIC FOCUS
TP605
DYNAMIC FOCUS
5Vp-p(0.2V/2ms div.)
9Vp-p(0.2V/20μs div.)
Q616~619
PULSE REVERSE
HSS
P614
CP2 3
BR603
1 2 3 4
HP HS VP VS
R COLOR SHADING
BR602
1 2 3 4
HP HS VP VS
B COLOR SHADING
HS HP VP VS
VR 608
VR 609
VR 610
VR 611
DARK SHADING
SD (R)
SD (B)
PROCESS CIRCUIT
(COLOR SHADING CORRECTION)
TO PROCESS CIRCUIT
PULSE GENERATOR
TO HEATOR
+12V
IC604 AN6552
+9V REGULATOR
VR619
IC606 AN6914
+6V SWITCHING REGULATOR
HSS
+5V REGULATOR
IC605,Q634,635,636
REMO. CON.
STANDBY
+B 5V
PROCESS CIRCUIT
+B 5V
A.W.C MICRO-COMPUTER
IC603
EVF OSCILLATOR
TO EVF

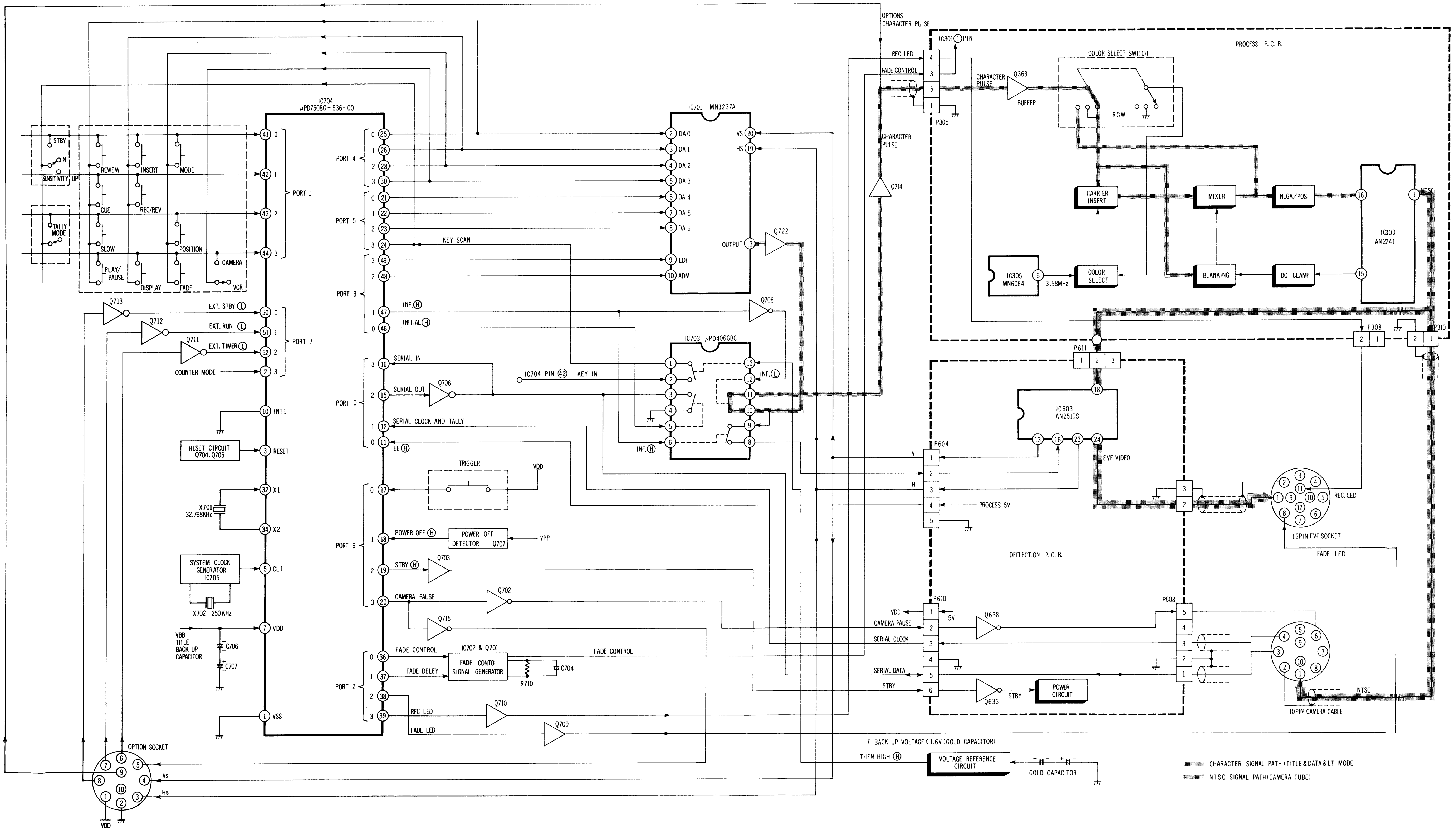
PROCESS BLOCK DIAGRAM


TP301
PRE AMP
V.P H.P
V.S H.S
VR304
OPTICAL BLACK
LEVEL SET
LUG
IRIS INDICATION
BLK
GAMMA
GAMMA.2
GAMMA.3
AGC
FADE
TO ABO
TP320
AMP
IC301 AN2133
AGC SET
VR302
VR303
COLOR CARRIER SET
TP302
COLOR CARRIER
LC301
HPF
IC302 AN2141
BLK
L-CLIP
L-CLIP
Y-CLIP SET
VR306
D.W.C.
IRIS CONTROL
IRIS SET
VR301
IRIS
COIL
WBL
TP307
L.P.F.
L.P.F.
L.P.F.
VR315~318
GAMMA. SET.
IC304 AN2331
VR310
PHASE SHIFT
R.B. SEPARATION
D.W.C.
R-OUT
B-OUT
IH D.L
VR305
GAIN SET
GAIN CONTROL
EXP AMP
LOG LAMP
GAMMA. SET.
VR311~314
NEGA ONLY(R.B) CONTROL
GAIN
CP1+WHD
WHD
CP1
BSC
SC SC WBL BLX VSS CP2
SYNC. GEIN
IC305
CS
L.L.C.L.
0.7mVp-p(20mV/10μs div.)
380mVp-p(10mV/10μs div.)
400mVp-p(10mV/10μs div.)
200mVp-p(10mV/20μs div.)
A.W.C.
LOW LUMINANCE SENSITIVITY CIRCUIT
TP305
GAIN CONTROL
DETECTER
AMP
MATRIX
L.P.F.
IC311 AN2340
TP315
D.L.
BUFFER
APERTURE
AMP
A.P.S.
L.P.F.
L.LS
L.L.C.S.
IC303 AN2241
Q304~310
COLOR TITLE CIRCUIT
Q312, 314, 315
SC
Q363, Q311
BUFFER AMP
FROM MICON
COLOR SELECT SW
TITLE
P/N SELECT
VR308
PEDESTAL SET
H.L. CUT PED. SET
SYNC.
RED CORRECT
VR320
R-Y SET
S.C.
L.P.F.
VR331
CARRIER BAL.
R-Y
VR332
CARRIER BAL.
B-Y
MOD
MOD
L.C.C.S.
SVPP. SET
S.C.
VR323
PHASE CORRECT
VR322
PHASE CORRECT
AMP
VR319
H.L.C.S.
B.P.F.
S.W DC
IC306 AN2431
IH DL
AMP
HPF
GAIN CONT.
VR307
GAMMA. COLECTION
Q373~376
Q371,372
INVERTER
PEDESTAL LEVEL SET
Q366~370
TP316
TP304
GAIN CONTROL
DETECTER
AMP
MATRIX
IC312 AN2341
MATRIX
IH DL
IC307 MN8036
L.P.F.
TP311
300mVp-p (20mV/20μs div.)
3.8Vp-p (0.1V/5ms div.)
LUMINANCE SIGNAL PATH
CHROMINANCE SIGNAL PATH

MICRO COMPUTER BLOCK DIAGRAM (SERIAL DATA/CLOCK SIGNAL PATH)


IC704
μPD7508G-536-00
IC701 MN1237A
IC703 μPD4066BC
STBY
N
SENSITIVITY UP
TALLY MODE
REVIEW
INSERT
MODE
CUE
REC/REV
SLOW
POSITION
CAMERA
PLAY/PAUSE
DISPLAY
FADE
VCR
PORT 1
PORT 4
PORT 5
PORT 3
PORT 7
PORT 0
PORT 6
PORT 2
Q713
Q712
Q711
EXT. STBY Ⓛ
EXT. RUN Ⓛ
EXT. TIMER Ⓛ
COUNTER MODE
INT1
RESET CIRCUIT Q704, Q705
RESET
X1
X701 32.768KHz
X2
SYSTEM CLOCK GENERATOR IC705
CL1
X702 250KHz
VDD
VBB TITLE BACK UP CAPACITOR
C706
C707
VSS
KEY SCAN
DA0
DA1
DA2
DA3
DA4
DA5
DA6
LDI
ADM
VS
HS
OUTPUT
Q722
INF.Ⓗ
INITIALⒽ
Q708
SERIAL IN
SERIAL OUT
Q706
SERIAL CLOCK AND TALLY
EEⒽ
IC704 PIN ㊷ KEY IN
INF.Ⓛ
INF.Ⓗ
TRIGGER
VDD
POWER OFF Ⓗ
POWER OFF DETECTOR Q707
VPP
STBY Ⓗ
Q703
CAMERA PAUSE
Q702
Q715
FADE CONTROL
IC702 & Q701
FADE CONTOL SIGNAL GENERATOR
C704
R710
FADE DELEY
FADE CONTROL
REC LED
Q710
FADE LED
Q709
OPTION SOCKET
Vs
Hs
VDD
OPTIONS CHARACTER PULSE
CHARACTER PULSE
Q714
REC LED
FADE CONTROL
IC301 ① PIN
P305
CHARACTER PULSE
Q363
BUFFER
COLOR SELECT SWITCH
RGW
PROCESS P.C.B.
CARRIER INSERT
MIXER
NEGA/POSI
IC303 AN2241
NTSC
IC305 MN6064
3.58MHz
COLOR SELECT
BLANKING
DC CLAMP
P308
P310
IC603 AN2510S
EVF VIDEO
P604
V
H
PROCESS 5V
P605
REC. LED
12PIN EVF SOCKET
FADE LED
DEFLECTION P.C.B.
P610
VDD
5V
CAMERA PAUSE
Q638
SERIAL CLOCK
SERIAL DATA
STBY
Q633
STBY
POWER CIRCUIT
P608
NTSC
10PIN CAMERA CABLE
IF BACK UP VOLTAGE < 1.6V (GOLD CAPACITOR)
THEN HIGH Ⓗ
VOLTAGE REFERENCE CIRCUIT
GOLD CAPACITOR
SERIAL DATA PATH
SERIAL DATA PATH
SERIAL CLOCK SIGNAL PATH

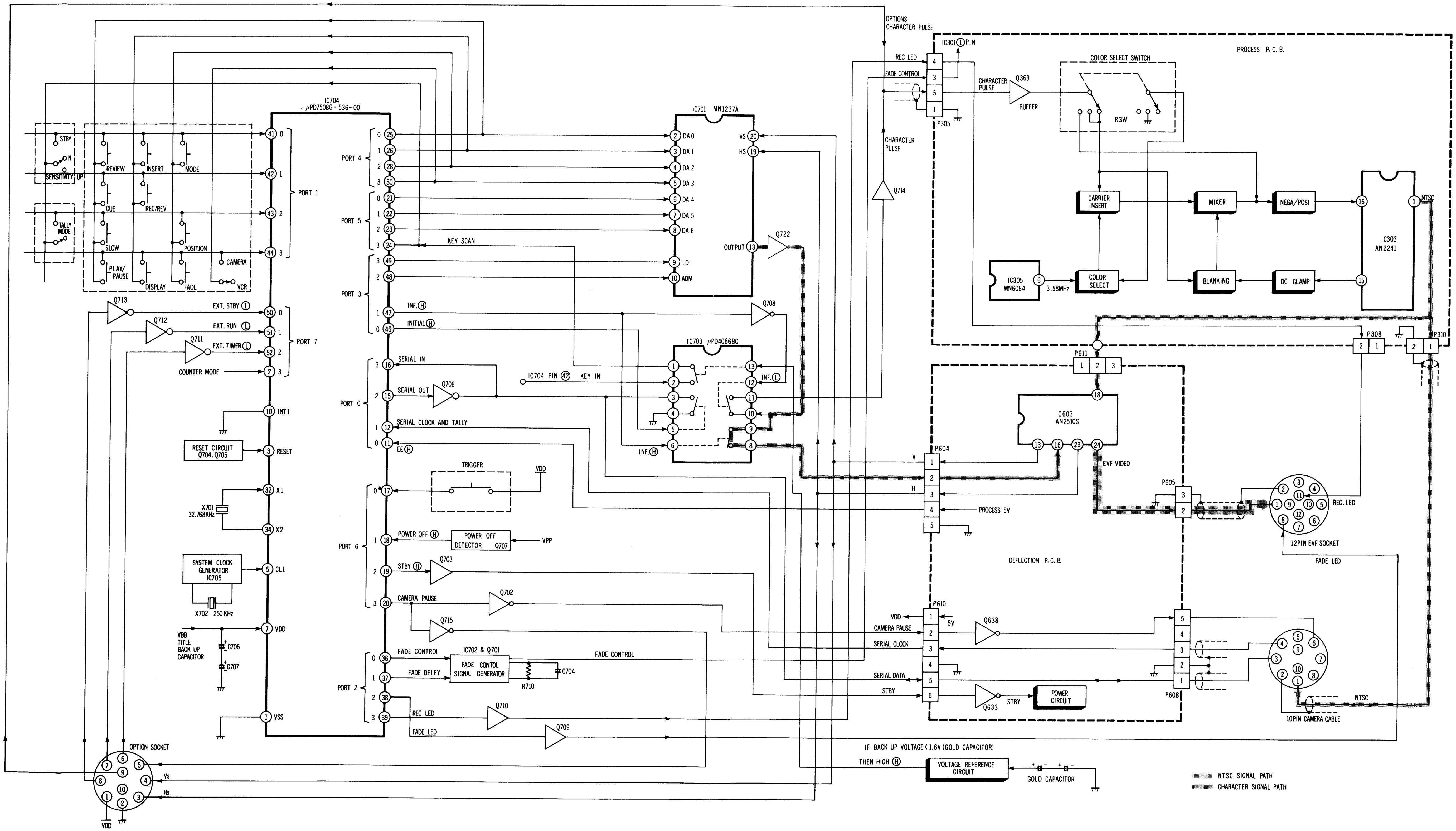
MICRO COMPUTER BLOCK DIAGRAM (TITLE & DATA & L.T MODE)


IC704
μPD7508G-536-00
PORT 1
PORT 4
PORT 5
PORT 3
PORT 7
PORT 0
PORT 6
PORT 2
STBY
SENSITIVITY UP
TALLY MODE
REVIEW
INSERT
MODE
CUE
REC/REV
SLOW
POSITION
CAMERA
PLAY/PAUSE
DISPLAY
FADE
VCR
Q713
Q712
Q711
EXT. STBY Ⓛ
EXT. RUN Ⓛ
EXT. TIMER Ⓛ
COUNTER MODE
INT1
RESET CIRCUIT Q704, Q705
RESET
X1
X701 32.768KHz
X2
SYSTEM CLOCK GENERATOR IC705
CL1
X702 250KHz
VDD
VBB TITLE BACK UP CAPACITOR
C706
C707
VSS
KEY SCAN
INF. Ⓗ
INITIAL Ⓗ
SERIAL IN
SERIAL OUT
Q706
SERIAL CLOCK AND TALLY
EE Ⓗ
TRIGGER
VDD
POWER OFF Ⓗ
POWER OFF DETECTOR Q707
VPP
STBY Ⓗ
Q703
CAMERA PAUSE
Q702
Q715
FADE CONTROL
FADE DELEY
IC702 & Q701
FADE CONTOL SIGNAL GENERATOR
R710
C704
REC LED
Q710
FADE LED
Q709
IC701 MN1237A
DA0
DA1
DA2
DA3
DA4
DA5
DA6
LDI
ADM
VS
HS
OUTPUT
Q722
Q708
IC703 μPD4066BC
IC704 PIN 42 KEY IN
INF. Ⓛ
INF. Ⓗ
OPTIONS CHARACTER PULSE
CHARACTER PULSE
Q714
IC301 ① PIN
REC LED
FADE CONTROL
P305
PROCESS P.C.B.
CHARACTER PULSE
Q363
BUFFER
COLOR SELECT SWITCH
RGW
CARRIER INSERT
MIXER
NEGA/POSI
IC303 AN2241
NTSC
IC305 MN6064
3.58MHz
COLOR SELECT
BLANKING
DC CLAMP
P308
P310
P611
IC603 AN2510S
P604
V
H
PROCESS 5V
EVF VIDEO
REC. LED
12PIN EVF SOCKET
FADE LED
DEFLECTION P.C.B.
P610
VDD
CAMERA PAUSE
SERIAL CLOCK
SERIAL DATA
STBY
5V
Q638
Q633
POWER CIRCUIT
P608
NTSC
10PIN CAMERA CABLE
IF BACK UP VOLTAGE < 1.6V (GOLD CAPACITOR) THEN HIGH Ⓗ
VOLTAGE REFERENCE CIRCUIT
GOLD CAPACITOR
OPTION SOCKET
Vs
Hs
VDD

▨ CHARACTER SIGNAL PATH (TITLE & DATA & LT MODE)

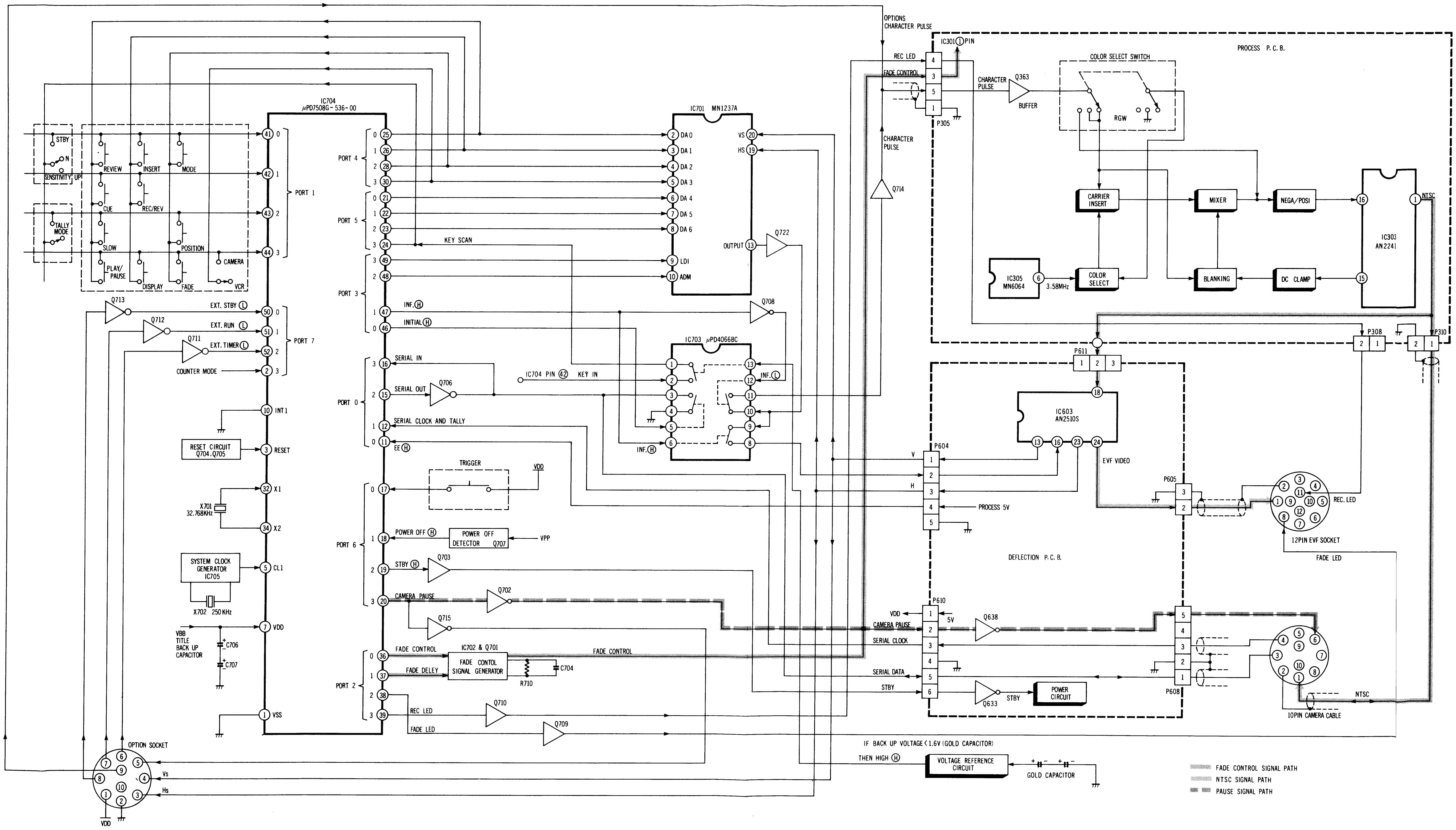
▨ NTSC SIGNAL PATH (CAMERA TUBE)

MICRO COMPUTER BLOCK DIAGRAM (INF MODE)

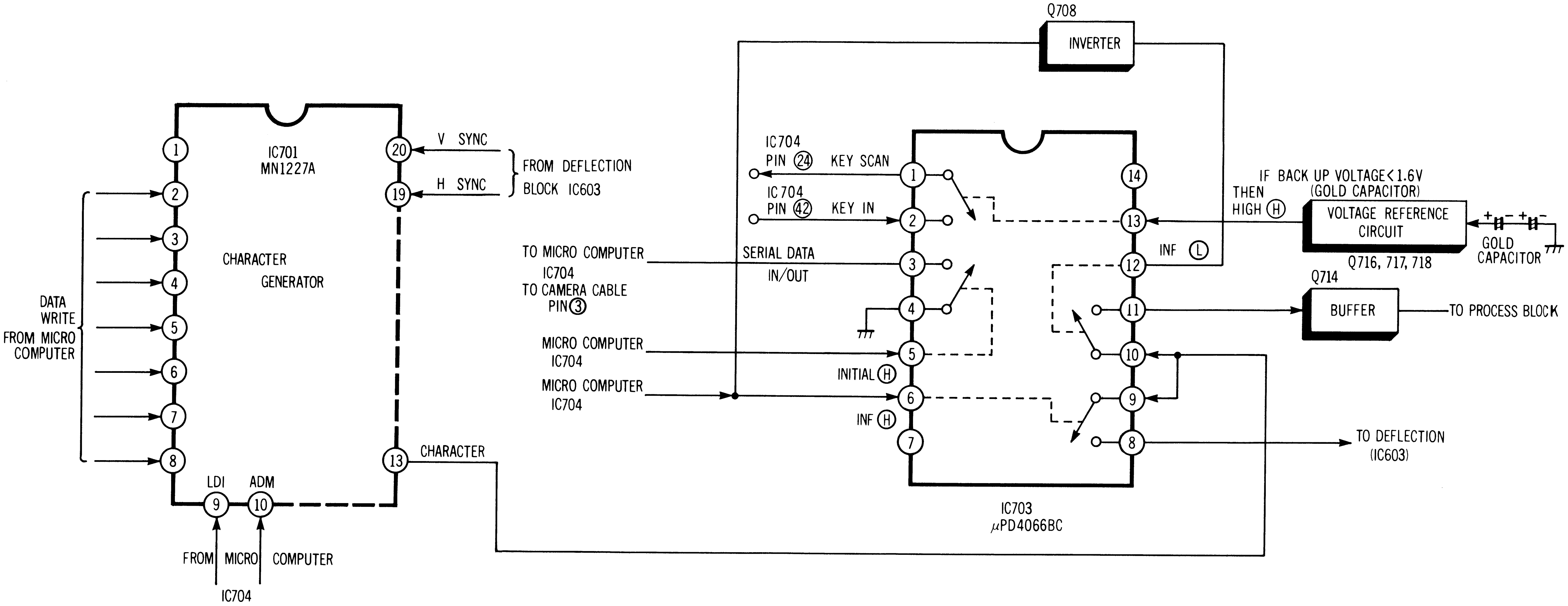


IC704
μPD7508G-536-00
STBY
ON
SENSITIVITY UP
TALLY MODE
REVIEW
INSERT
MODE
CUE
REC/REV
SLOW
POSITION
CAMERA
PLAY/PAUSE
DISPLAY
FADE
VCR
PORT 1
PORT 4
PORT 5
PORT 3
PORT 7
PORT 0
PORT 6
PORT 2
KEY SCAN
INF.Ⓗ
INITIAL Ⓗ
Q713
Q712
Q711
EXT. STBY Ⓛ
EXT. RUN Ⓛ
EXT. TIMER Ⓛ
COUNTER MODE
INT1
RESET CIRCUIT Q704.Q705
RESET
X701 32.768KHz
X1
X2
SYSTEM CLOCK GENERATOR IC705
CL1
X702 250KHz
VDD
VBB TITLE BACK UP CAPACITOR
C706
C707
VSS
SERIAL IN
SERIAL OUT
Q706
SERIAL CLOCK AND TALLY
EEⒽ
TRIGGER
VDD
POWER OFF Ⓗ
POWER OFF DETECTOR Q707
VPP
STBY Ⓗ
Q703
CAMERA PAUSE
Q702
Q715
FADE CONTROL
IC702 & Q701
FADE CONTOL SIGNAL GENERATOR
FADE DELEY
R710
C704
REC LED
Q710
FADE LED
Q709
OPTION SOCKET
Vs
Hs
VDD
IC701 MN1237A
DA0
DA1
DA2
DA3
DA4
DA5
DA6
LDI
ADM
VS
HS
OUTPUT
Q722
Q708
IC703 μPD4066BC
IC704 PIN ㊷ KEY IN
INF.Ⓛ
INF.Ⓗ
OPTIONS CHARACTER PULSE
CHARACTER PULSE
Q714
REC LED
FADE CONTROL
IC301 ① PIN
P305
CHARACTER PULSE
Q363
BUFFER
COLOR SELECT SWITCH
RGW
PROCESS P.C.B.
CARRIER INSERT
MIXER
NEGA/POSI
IC303 AN2241
NTSC
IC305 MN6064
3.58MHz
COLOR SELECT
BLANKING
DC CLAMP
P308
P310
P611
IC603 AN2510S
P604
V
H
EVF VIDEO
P605
PROCESS 5V
REC. LED
12PIN EVF SOCKET
FADE LED
DEFLECTION P.C.B.
P610
VDD
5V
CAMERA PAUSE
Q638
SERIAL CLOCK
SERIAL DATA
STBY
Q633
STBY
POWER CIRCUIT
P608
NTSC
10PIN CAMERA CABLE
IF BACK UP VOLTAGE < 1.6V (GOLD CAPACITOR) THEN HIGH Ⓗ
VOLTAGE REFERENCE CIRCUIT
GOLD CAPACITOR
NTSC SIGNAL PATH
CHARACTER SIGNAL PATH

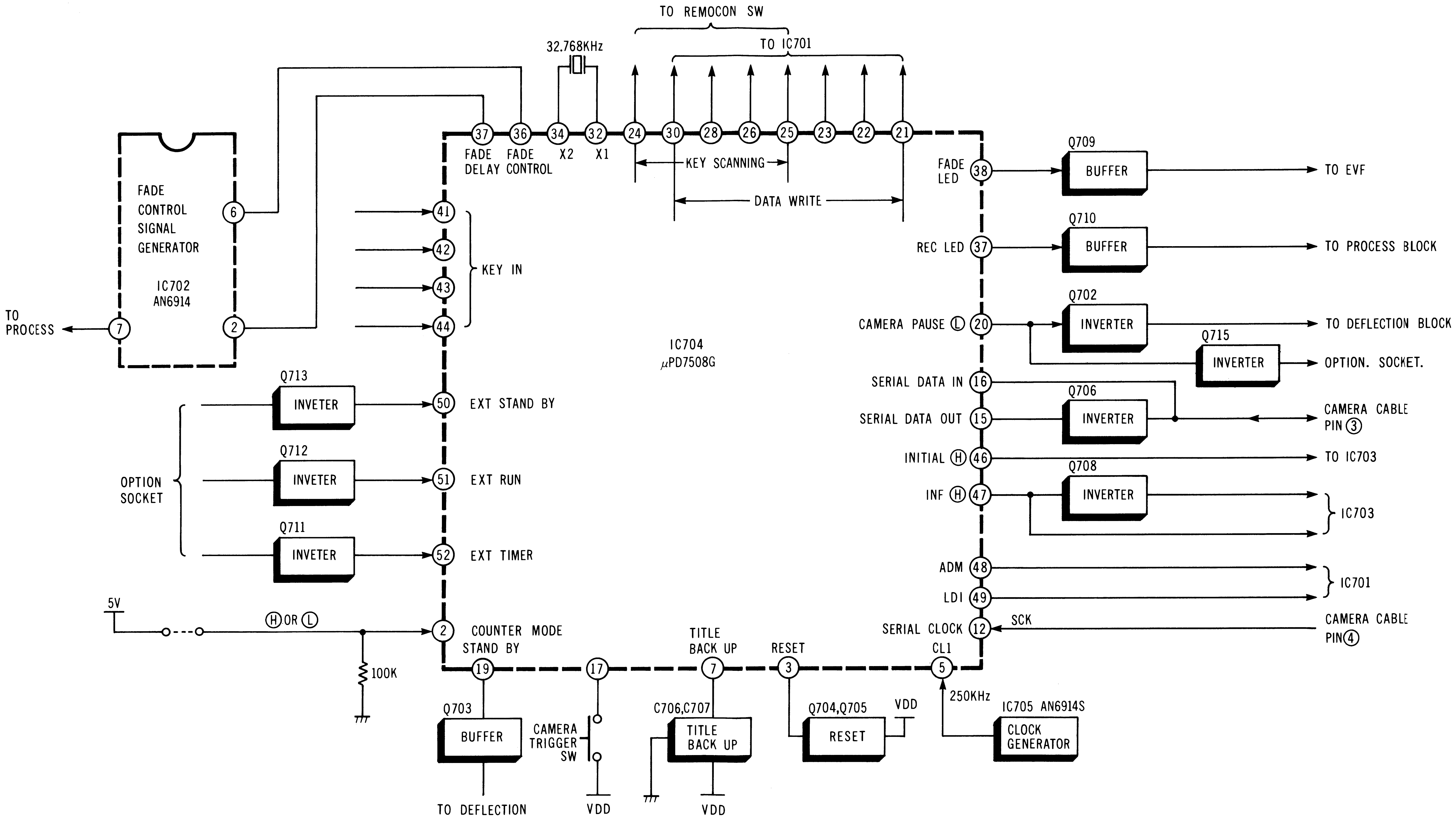
MICRO COMPUTER BLOCK DIAGRAM (FADE MODE)


IC704
μPD7508G-536-00
IC701 MN1237A
IC703 μPD4066BC
STBY
SENSITIVITY UP
TALLY MODE
REVIEW
INSERT
MODE
CUE
REC/REV
SLOW
POSITION
CAMERA
PLAY/PAUSE
DISPLAY
FADE
VCR
PORT 1
PORT 4
PORT 5
PORT 3
PORT 7
PORT 0
PORT 6
PORT 2
Q713
Q712
Q711
EXT. STBY Ⓛ
EXT. RUN Ⓛ
EXT. TIMER Ⓛ
COUNTER MODE
INT1
RESET CIRCUIT
Q704.Q705
RESET
X701
32.768KHz
X1
X2
SYSTEM CLOCK GENERATOR
IC705
CL1
X702 250KHz
VDD
VBB
TITLE
BACK UP
CAPACITOR
C706
C707
VSS
KEY SCAN
DA0
DA1
DA2
DA3
DA4
DA5
DA6
LDI
ADM
VS
HS
OUTPUT
Q722
INF. Ⓗ
INITIAL Ⓗ
Q708
SERIAL IN
SERIAL OUT
Q706
SERIAL CLOCK AND TALLY
EE Ⓗ
IC704 PIN ㊷ KEY IN
INF. Ⓛ
INF. Ⓗ
TRIGGER
VDD
POWER OFF Ⓗ
POWER OFF DETECTOR Q707
VPP
STBY Ⓗ
Q703
CAMERA PAUSE
Q702
Q715
FADE CONTROL
FADE DELEY
IC702 & Q701
FADE CONTOL SIGNAL GENERATOR
R710
C704
FADE CONTROL
REC LED
Q710
FADE LED
Q709
OPTION SOCKET
Vs
Hs
VDD
OPTIONS
CHARACTER PULSE
REC LED
FADE CONTROL
IC301 ① PIN
P305
CHARACTER PULSE
Q714
CHARACTER PULSE
Q363
BUFFER
COLOR SELECT SWITCH
RGW
PROCESS P.C.B.
CARRIER INSERT
MIXER
NEGA/POSI
IC303
AN2241
NTSC
IC305
MN6064
3.58MHz
COLOR SELECT
BLANKING
DC CLAMP
P308
P310
P611
IC603
AN2510S
P604
V
H
PROCESS 5V
EVF VIDEO
P605
REC. LED
12PIN EVF SOCKET
FADE LED
DEFLECTION P.C.B.
P610
VDD
5V
CAMERA PAUSE
Q638
SERIAL CLOCK
SERIAL DATA
STBY
Q633
STBY
POWER CIRCUIT
P608
NTSC
10PIN CAMERA CABLE
IF BACK UP VOLTAGE < 1.6V (GOLD CAPACITOR)
THEN HIGH Ⓗ
VOLTAGE REFERENCE CIRCUIT
GOLD CAPACITOR
FADE CONTROL SIGNAL PATH
NTSC SIGNAL PATH
PAUSE SIGNAL PATH

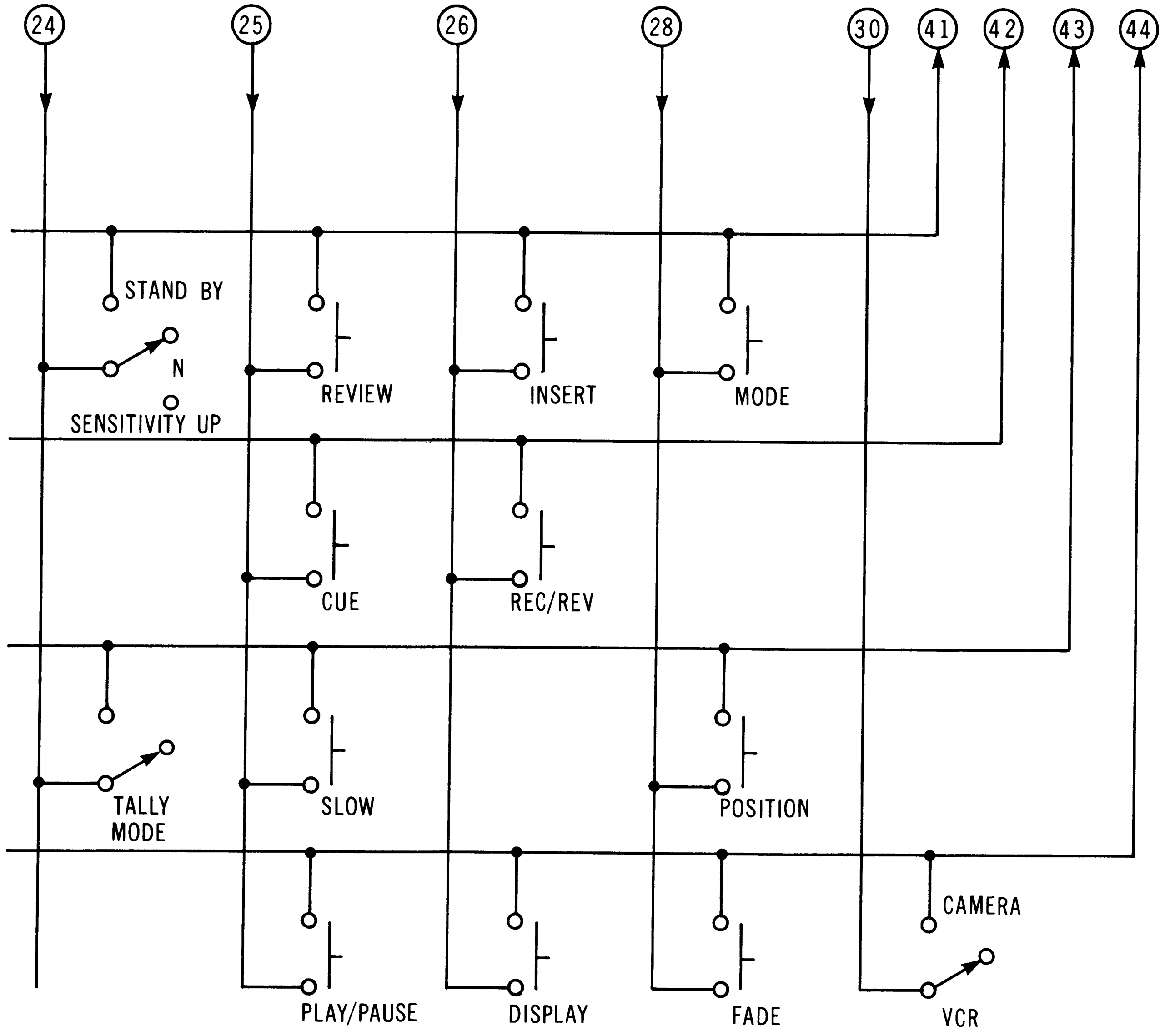
CAMERA REMOTE CONTROL (A) BLOCK DIAGRAM

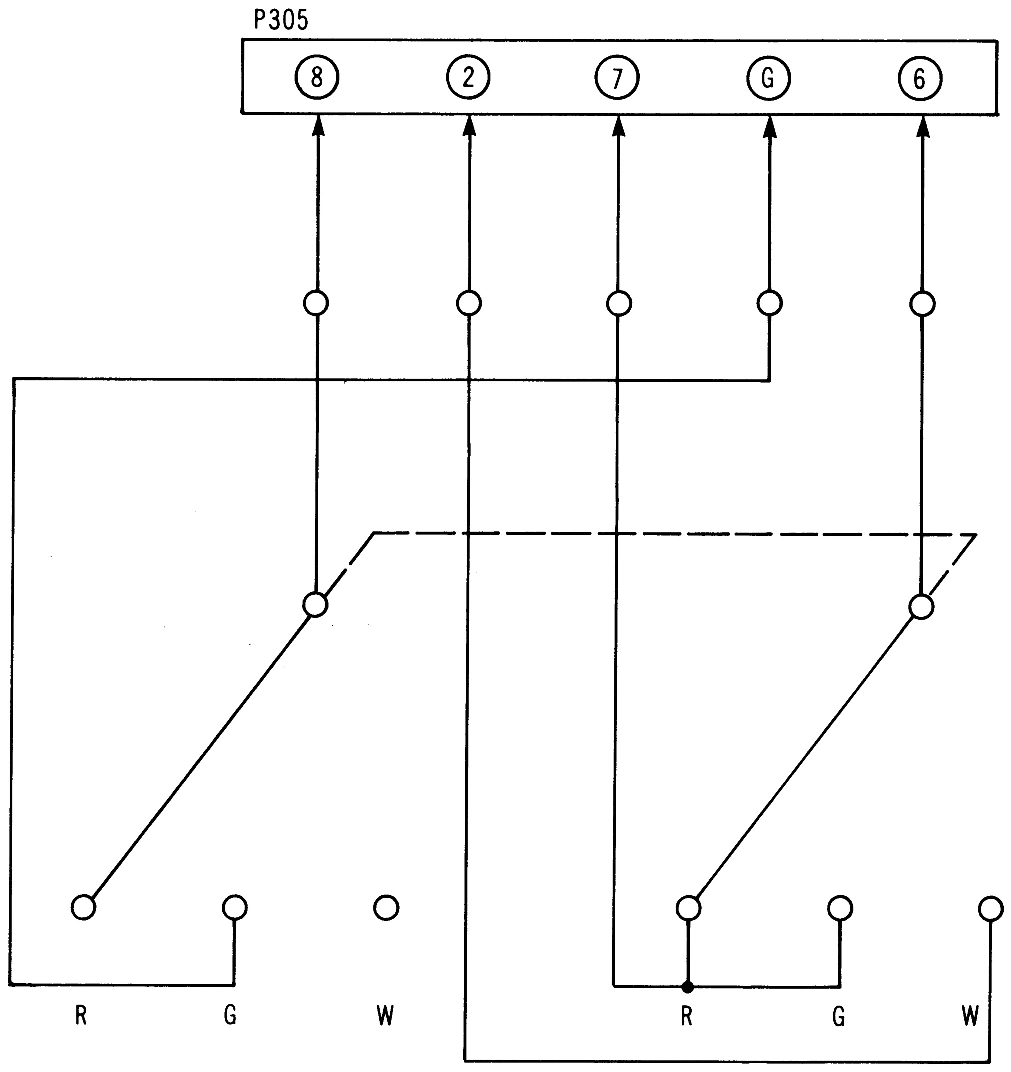

IC701
MN1227A
CHARACTER GENERATOR
DATA WRITE FROM MICRO COMPUTER
V SYNC
H SYNC
FROM DEFLECTION BLOCK IC603
CHARACTER
LDI
ADM
FROM MICRO COMPUTER
IC704
Q708
INVERTER
IC704 PIN ㉔ KEY SCAN
IC704 PIN ㊷ KEY IN
TO MICRO COMPUTER IC704 TO CAMERA CABLE PIN③
SERIAL DATA IN/OUT
MICRO COMPUTER IC704
MICRO COMPUTER IC704
INITIAL Ⓗ
INF Ⓗ
INF Ⓛ
IF BACK UP VOLTAGE<1.6V (GOLD CAPACITOR) THEN HIGH Ⓗ
VOLTAGE REFERENCE CIRCUIT
Q716, 717, 718
GOLD CAPACITOR
Q714
BUFFER
TO PROCESS BLOCK
TO DEFLECTION (IC603)
IC703
μPD4066BC
1
2
3
4
5
6
7
8
9
10
11
12
13
14
19
20

CAMERA REMOTE CONTROL (B) BLOCK DIAGRAM

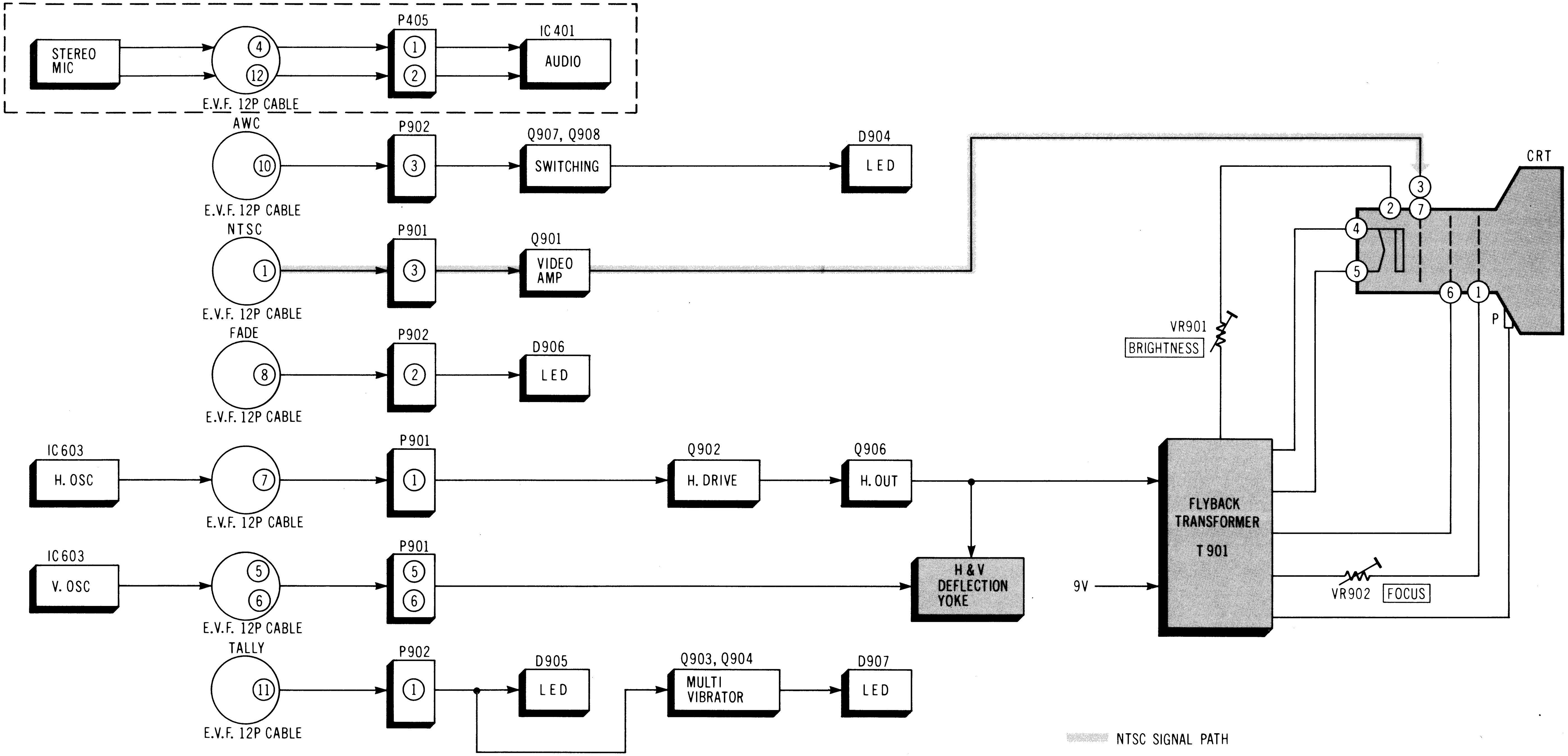

TO REMOCON SW
TO IC701
32.768KHz
37
36
34
32
24
30
28
26
25
23
22
21
FADE DELAY
FADE CONTROL
X2
X1
KEY SCANNING
DATA WRITE
FADE CONTROL SIGNAL GENERATOR
IC702
AN6914
6
7
2
TO PROCESS
41
42
43
44
KEY IN
IC704
μPD7508G
Q713
INVETER
Q712
INVETER
Q711
INVETER
OPTION SOCKET
50
EXT STAND BY
51
EXT RUN
52
EXT TIMER
5V
Ⓗ OR Ⓛ
100K
2
COUNTER MODE
STAND BY
19
17
7
3
5
TITLE BACK UP
RESET
CL1
Q703
BUFFER
TO DEFLECTION
CAMERA TRIGGER SW
VDD
C706,C707
TITLE BACK UP
VDD
Q704,Q705
RESET
VDD
250KHz
IC705 AN6914S
CLOCK GENERATOR
FADE LED
38
Q709
BUFFER
TO EVF
REC LED
37
Q710
BUFFER
TO PROCESS BLOCK
CAMERA PAUSE Ⓛ
20
Q702
INVERTER
TO DEFLECTION BLOCK
Q715
INVERTER
OPTION. SOCKET.
SERIAL DATA IN
16
SERIAL DATA OUT
15
Q706
INVERTER
CAMERA CABLE PIN ③
INITIAL Ⓗ
46
TO IC703
INF Ⓗ
47
Q708
INVERTER
IC703
ADM
48
LDI
49
IC701
SERIAL CLOCK
12
SCK
CAMERA CABLE PIN ④

CAMERA REMOTE CONTROL (S) BLOCK DIAGRAM


24
25
26
28
30
41
42
43
44
STAND BY
N
SENSITIVITY UP
REVIEW
INSERT
MODE
CUE
REC/REV
TALLY
MODE
SLOW
POSITION
CAMERA
PLAY/PAUSE
DISPLAY
FADE
VCR


P305
8
2
7
G
6
R
G
W
R
G
W

ELECTRONIC VIEWFINDER BLOCK DIAGRAM


STEREO MIC
E.V.F. 12P CABLE
4
12
P405
1
2
IC 401
AUDIO
AWC
10
E.V.F. 12P CABLE
P902
3
Q907, Q908
SWITCHING
D904
LED
NTSC
1
E.V.F. 12P CABLE
P901
3
Q901
VIDEO AMP
FADE
8
E.V.F. 12P CABLE
P902
2
D906
LED
IC 603
H. OSC
7
E.V.F. 12P CABLE
P901
1
Q902
H. DRIVE
Q906
H. OUT
IC 603
V. OSC
5
6
E.V.F. 12P CABLE
P901
5
6
H & V DEFLECTION YOKE
TALLY
11
E.V.F. 12P CABLE
P902
1
D905
LED
Q903, Q904
MULTI VIBRATOR
D907
LED
CRT
3
2
7
4
5
6
1
P
VR901
BRIGHTNESS
FLYBACK TRANSFORMER
T 901
9V
VR902
FOCUS
NTSC SIGNAL PATH

PRODUCT SAFETY NOTE

The shaded area on this **block diagram** incorporates special features important for protection from X-Radiation, fire and electrical shock hazards when servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the **block diagram**

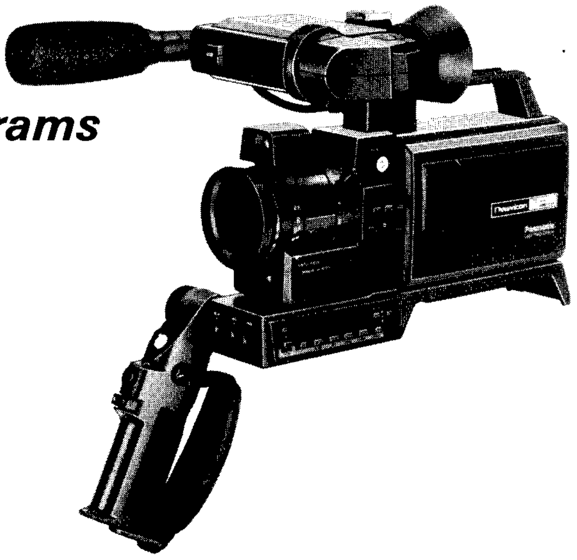
ORDER NO. VRD-8303-372

Service Manual

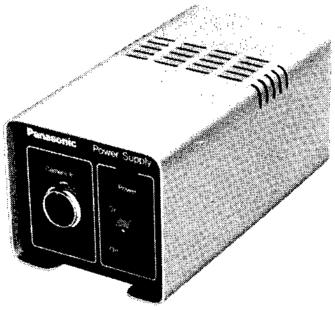
Color Video Camera
PK-957
Power Supply Unit
PK-A789S

Vol. 4

Schematic Diagrams



PK-957



PK-A789S

SPECIFICATIONS:

Power Source:	DC 12V ± 10% AC 120V ± 10%, 60Hz ± 0.5% (with Power Supply Unit)
Power Consumption: (with E.V.F)	DC 6.6W at 12V DC (Battery) DC 2.0W at standby
Newvicon Tube System:	2/3″ frequency separation single tube system (built-in stripe filter)
Single Carrier Frequency:	5MHz
Focus System:	Electro-static type
Lens Mounting:	Built-in zoom lens (not "C" mount)
Lens:	8:1 zoom lens with auto/manual iris control. Auto zoom lens and macro construction F: 1.6, f: 12—96mm d: 1.2m to infinity
Lens Diameter:	58mm
Light Sensitivity:	Minimum light intensity on optical image: 10 Lux (F: 1.4) Optimum light intensity on optical image: 900 Lux
Video Output Level:	1.0Vp-p, 75Ω (M type coaxial connector) (Standard NTSC signal)
Sync. System:	Internal Sync.: RS-170
Signal to Noise Ratio:	More than 45dB
Horizontal Resolution:	300 lines

Color Temperature Control:	2 step switch (indoor/outdoor) & auto adjust
Microphone:	Built-in stereo microphone
Audio Output Level:	−20dB, Hi-impedance
Audio Output Impedance:	High impedance (1KΩ)
External Microphone Input Impedance: (Left, Right)	600Ω unbalanced
Electronic Viewfinder:	Monochrome 1 inch CRT
Operating Temperature:	5°C to 40°C
Operating Humidity:	10% to 75%
Operating Position:	Normal position only
Weight:	Camera Head with E.V.F. 5.5 lbs (with lens, 7ft cable & shoulder pad/handle grip) AC adaptor (option) 2.4 lbs
Dimensions:	Camera Head with E.V.F. 8.3″(W) × 8.7″(H) × 11.8″(D) 208mm(W) × 218mm(H) × 296mm(D) AC adaptor (option) 3″(W) × 3″(H) × 6″(D) 79mm(W) × 75mm(H) × 149mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic®

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Ontario, L4W 2T3

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Division of Matsushita Electric
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Victoria Industrial Park
Carolina, Puerto Rico 00630

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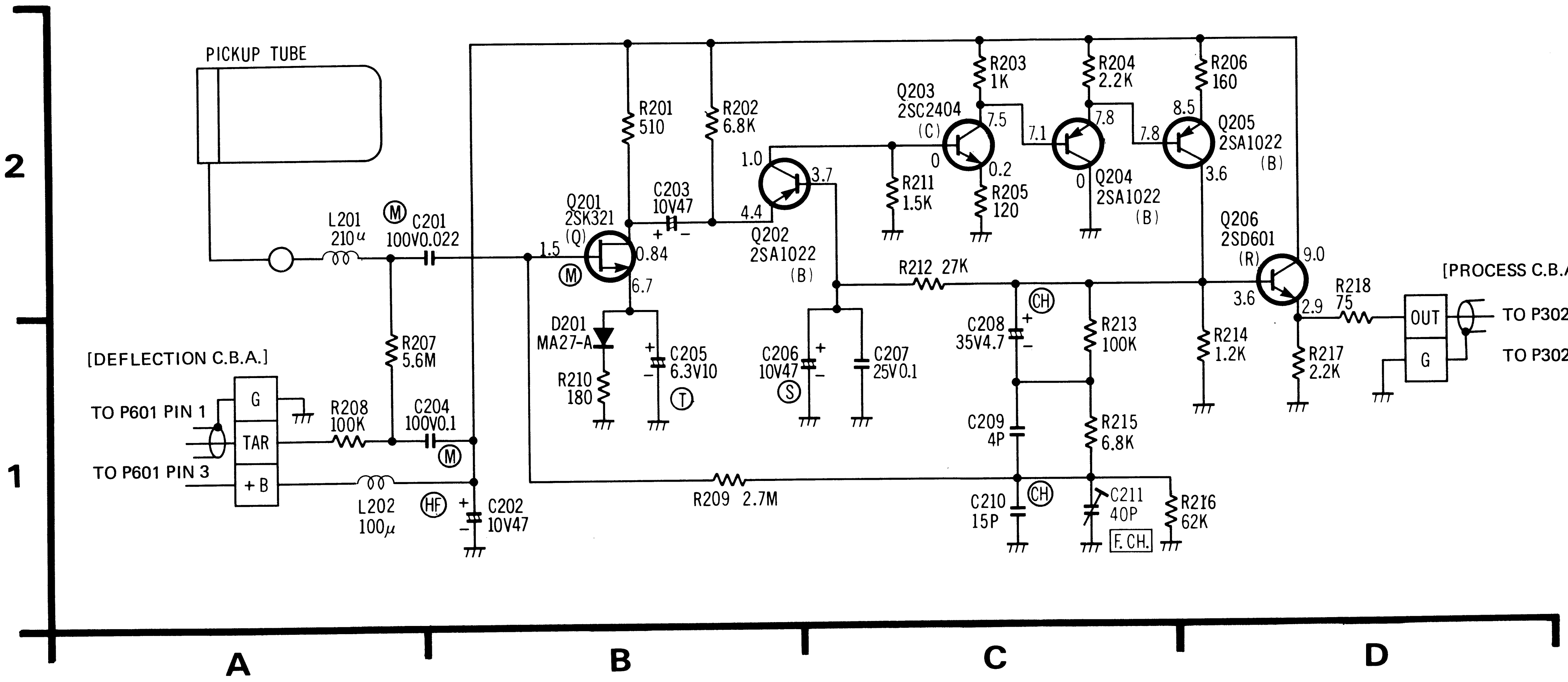
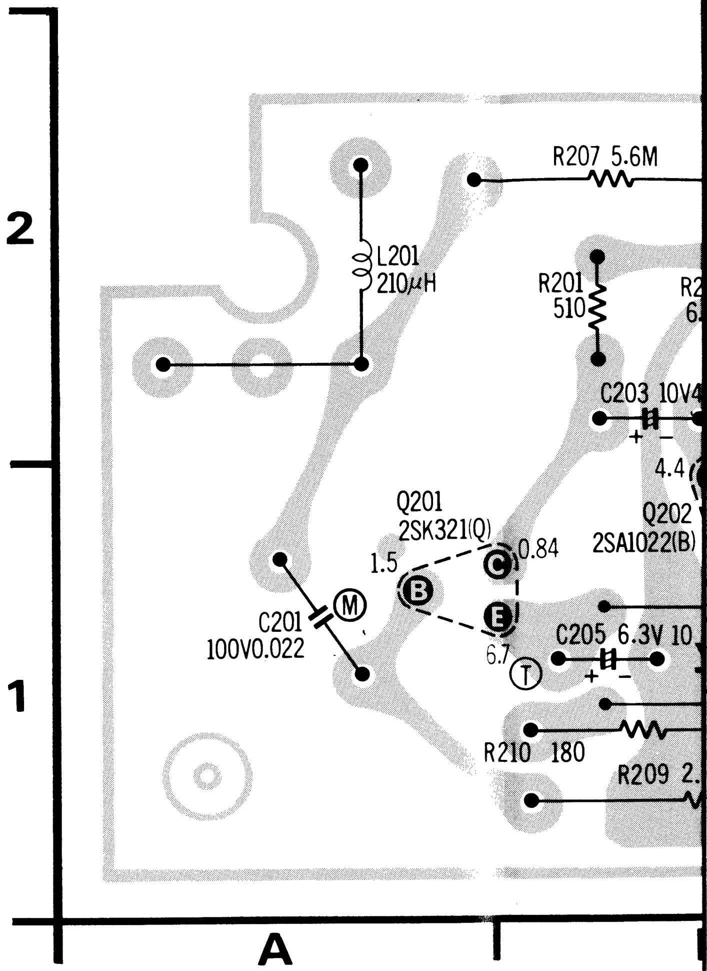
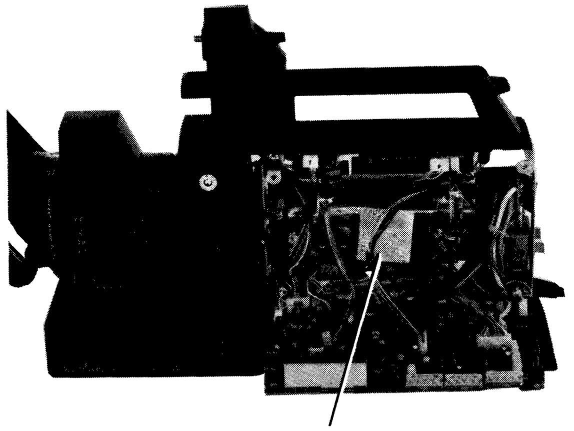
PRE-AMP SCHEMATIC DIAGRAM


2
1
PICKUP TUBE
L201
210u
M
C201
100V0.022
R207
5.6M
[DEFLECTION C.B.A.]
TO P601 PIN 1
TO P601 PIN 3
G
TAR
+B
R208
100K
C204
100V0.1
M
L202
100µ
HF
C202
10V47
Q201
2SK321
(Q)
1.5
0.84
6.7
M
D201
MA27-A
R210
180
C205
6.3V10
T
R201
510
R202
6.8K
C203
10V47
1.0
3.7
4.4
Q202
2SA1022
(B)
C206
10V47
S
C207
25V0.1
R209 2.7M
R212 27K
Q203
2SC2404
(C)
7.5
0
0.2
R203
1K
R205
120
R211
1.5K
7.1
7.8
0
Q204
2SA1022
(B)
R204
2.2K
8.5
7.8
3.6
Q205
2SA1022
(B)
R206
160
CH
C208
35V4.7
R213
100K
C209
4P
R215
6.8K
CH
C210
15P
C211
40P
F.CH.
R216
62K
Q206
2SD601
(R)
9.0
3.6
2.9
R214
1.2K
R217
2.2K
R218
75
[PROCESS C.B.A.]
OUT
G
TO P302 PIN 1
TO P302 PIN 2
A
B
C
D

PRE-AMP CIRCUIT BOARD

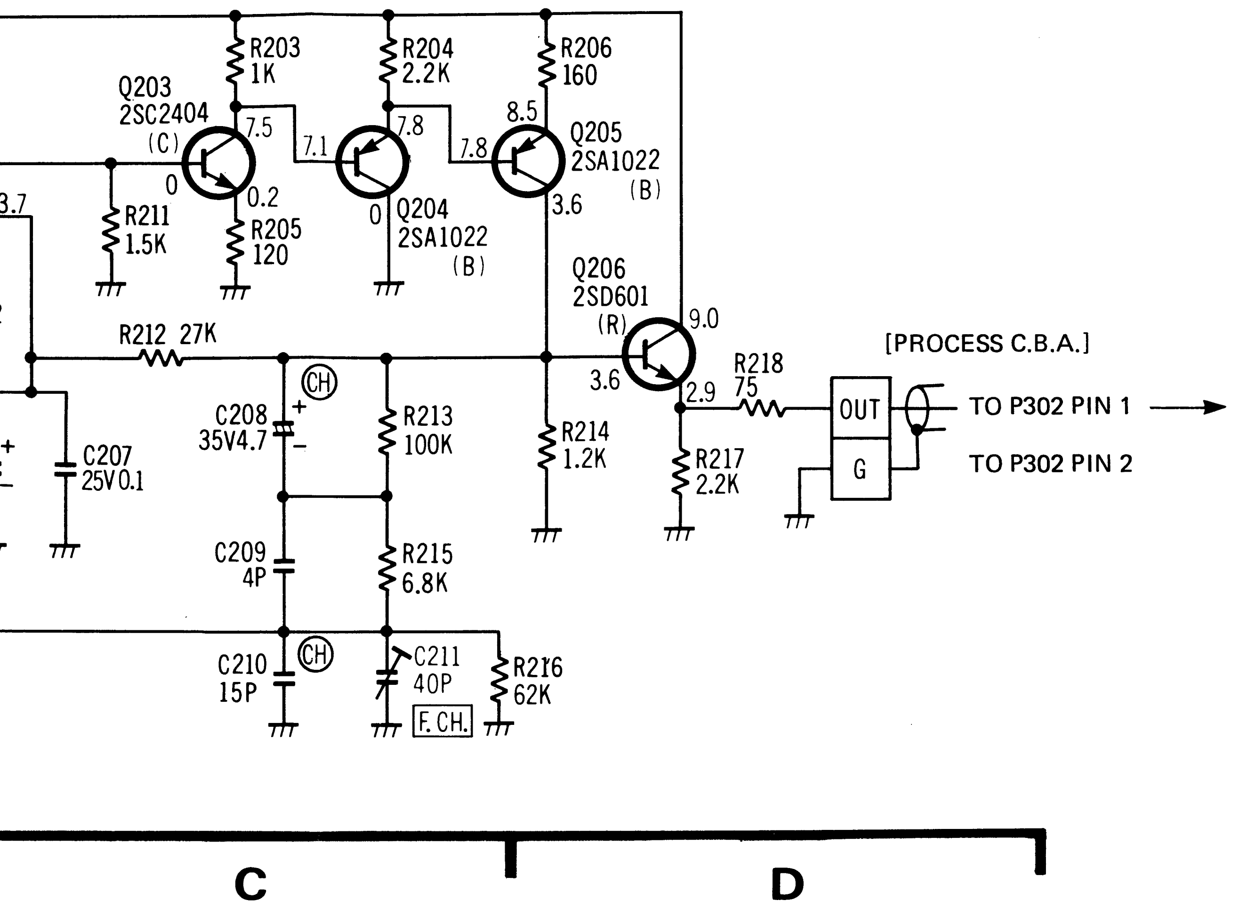

2
1
A
R207 5.6M
L201
210µH
R201
510
C203 10V4
4.4
Q202
2SA1022(B)
Q201
2SK321(Q)
1.5
0.84
B
C
E
6.7
C201
100V0.022
M
C205 6.3V 10
T
R210 180
R209 2.



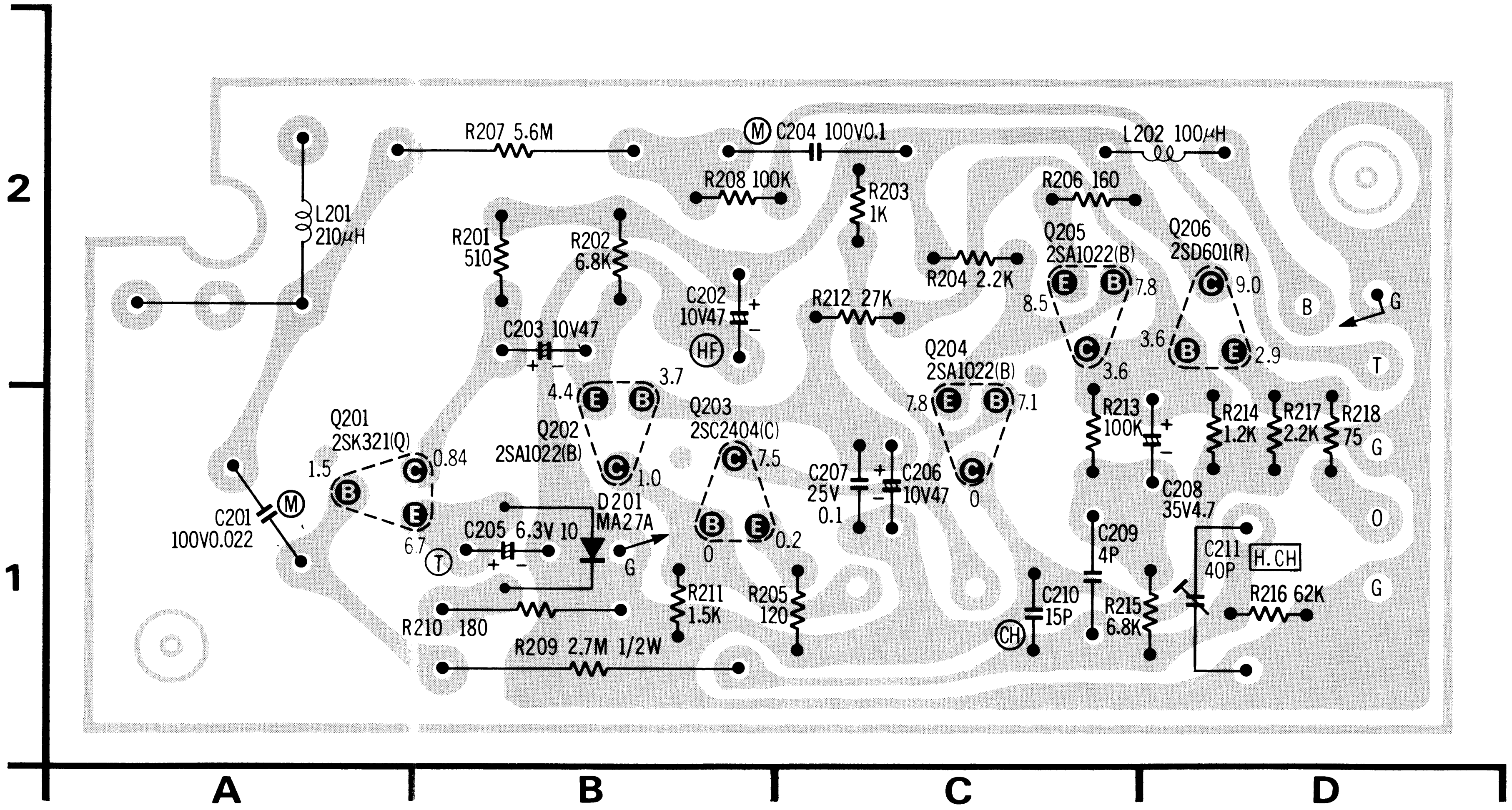
Pre-Amp Circuit Board

NOTES

1. Ⓝ NON POLARITY CAPACITOR
2. Ⓣ TANTALUM CAPACITOR
3. Ⓜ MYLAR CAPACITOR

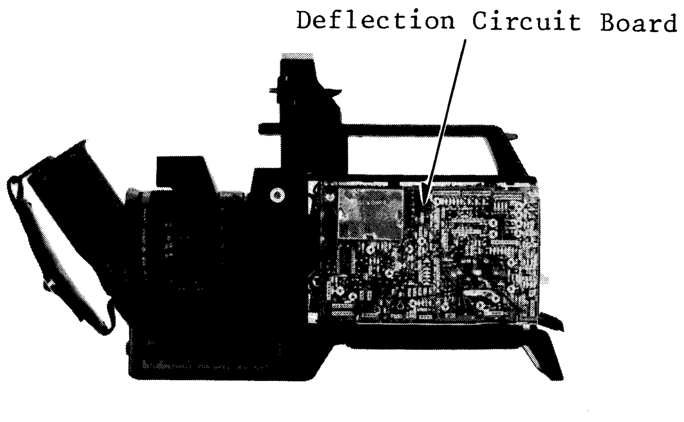

Q203
2SC2404
(C)
R203
1K
7.5
0
0.2
R211
1.5K
R205
120
3.7
7.1
Q204
2SA1022
(B)
R204
2.2K
7.8
0
R206
160
8.5
Q205
2SA1022
(B)
7.8
3.6
Q206
2SD601
(R)
9.0
3.6
2.9
R212 27K
C207
25V0.1
C208
35V4.7
CH
R213
100K
R214
1.2K
R218
75
R217
2.2K
[PROCESS C.B.A.]
OUT
G
TO P302 PIN 1
TO P302 PIN 2
C209
4P
R215
6.8K
C210
15P
CH
C211
40P
F.CH.
R216
62K
C
D

PRE-AMP CIRCUIT BOARD (VEPW0187)

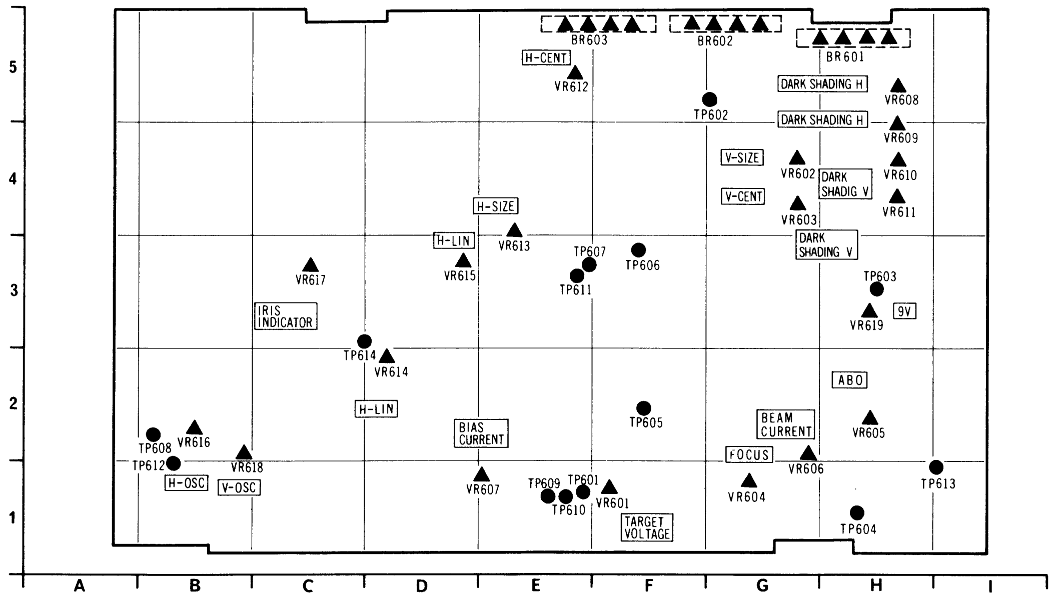

2
1
A
B
C
D
R207 5.6M
C204 100V0.1
L202 100μH
L201
210μH
R208 100K
R203
1K
R206 160
R201
510
R202
6.8K
C202
10V47
HF
R212 27K
R204 2.2K
Q205
2SA1022(B)
Q206
2SD601(R)
8.5
7.8
9.0
3.6
3.6
2.9
C203 10V47
4.4
3.7
Q201
2SK321(Q)
1.5
0.84
6.7
Q202
2SA1022(B)
1.0
Q203
2SC2404(C)
7.5
0
0.2
Q204
2SA1022(B)
7.8
7.1
0
C207
25V
0.1
C206
10V47
R213
100K
R214
1.2K
R217
2.2K
R218
75
C208
35V4.7
C201
100V0.022
C205 6.3V 10
T
D201
MA27A
G
R211
1.5K
R205
120
C209
4P
C210
15P
CH
R215
6.8K
C211
40P
H.CH
R216 62K
R210 180
R209 2.7M 1/2W
B
G
T
G
O
G

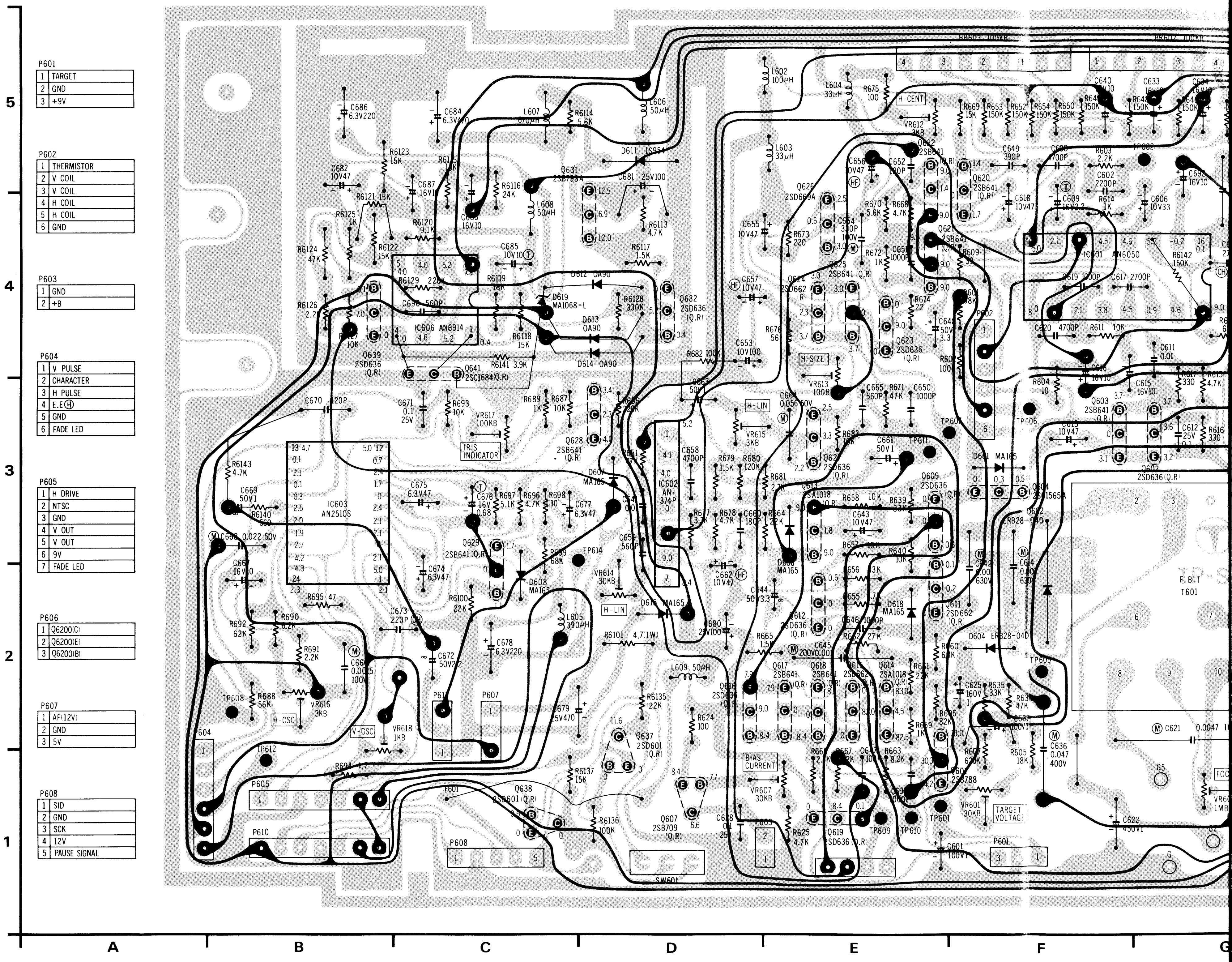
NOTES

1. Ⓝ NON POLARITY CAPACITOR
2. Ⓣ TANTALUM CAPACITOR
3. Ⓜ MYLAR CAPACITOR


Deflection Circuit Board

DEFLECTION CIRCUIT BOARD (VEPW0189)


BR603
BR602
BR601
H-CENT
VR612
TP602
DARK SHADING H
VR608
DARK SHADING H
VR609
V-SIZE
V-CENT
VR602
DARK SHADIG V
VR610
VR611
VR603
DARK SHADING V
H-SIZE
H-LIN
VR615
VR613
TP607
TP606
TP611
TP603
9V
VR619
VR617
IRIS INDICATOR
TP614
VR614
H-LIN
ABO
BIAS CURRENT
TP605
BEAM CURRENT
VR605
FOCUS
VR606
TP608
VR616
TP612
VR618
H-OSC
V-OSC
VR607
TP609
TP601
TP610
VR601
TARGET VOLTAGE
VR604
TP613
TP604
5
4
3
2
1
A
B
C
D
E
F
G
H
I


5
4
3
2
1
A
B
C
D
E
F
G
IC603 AN2510S
IC606 AN6914
IC602 AN-374P
IC601 AN6050
F.B.T T601
SW601
H-CENT
H-SIZE
H-LIN
H-OSC
V-OSC
IRIS INDICATOR
BIAS CURRENT
TARGET VOLTAGE

P601

1	TARGET
2	GND
3	+9V

P602

1	THERMISTOR
2	V COIL
3	V COIL
4	H COIL
5	H COIL
6	GND

P603

1	GND
2	+8

P604

1	V PULSE
2	CHARACTER
3	H PULSE
4	E.E(H)
5	GND
6	FADE LED

P605

1	H DRIVE
2	NTSC
3	GND
4	V OUT
5	V OUT
6	9V
7	FADE LED

P606

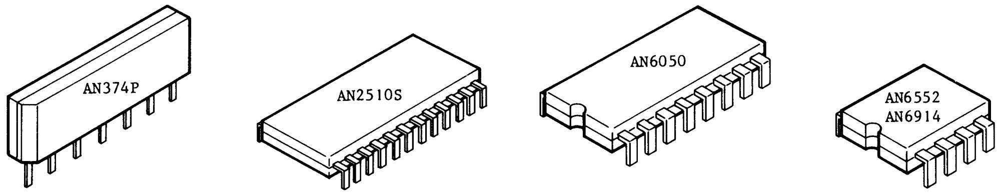
1	Q6200(C)
2	Q6200(E)
3	Q6200(B)

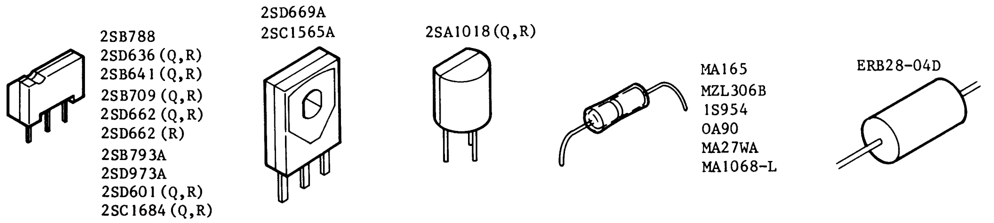
P607

1	AF(12V)
2	GND
3	5V

P608

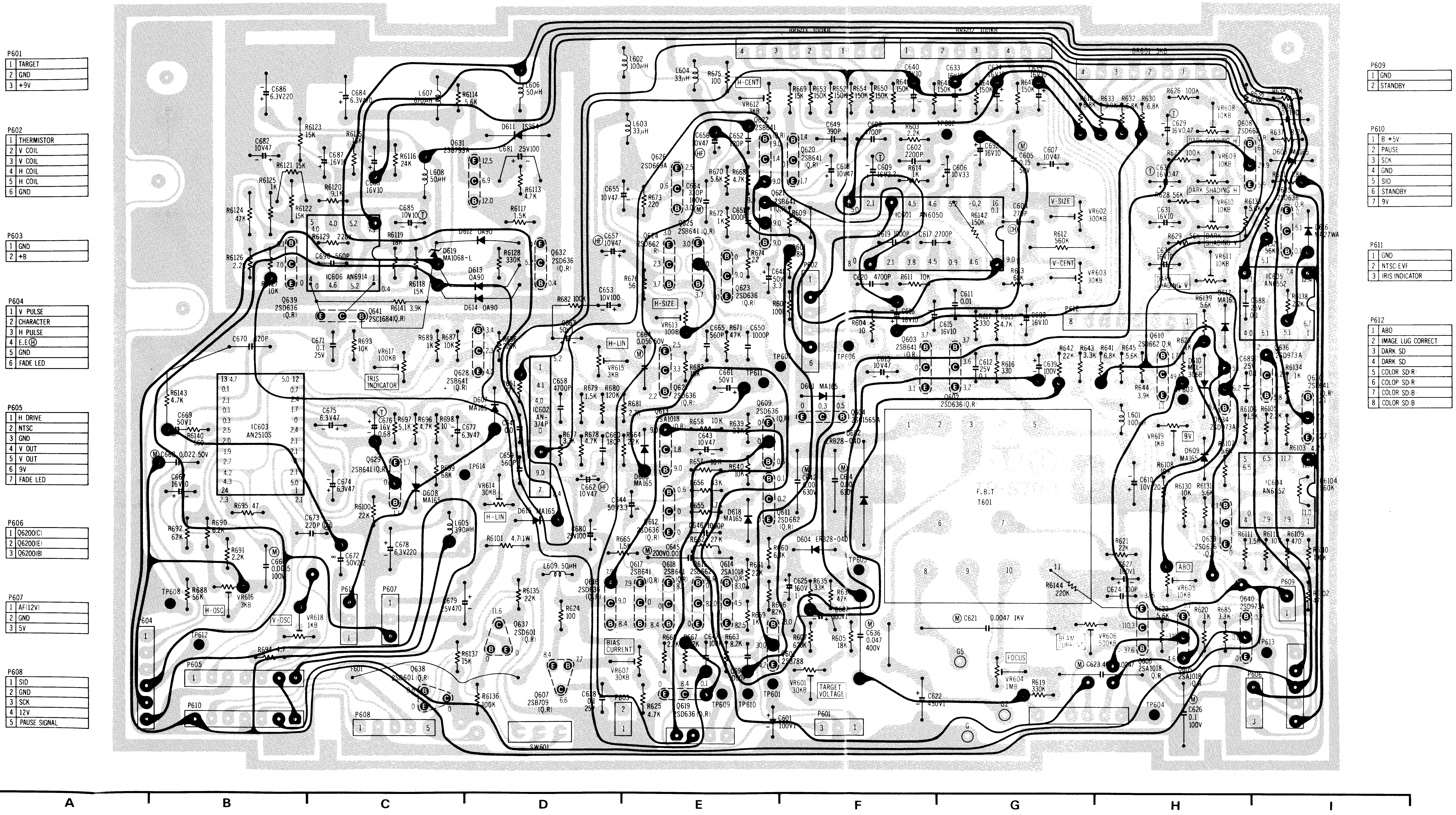
1	SID
2	GND
3	SCK
4	12V
5	PAUSE SIGNAL


AN374P
AN2510S
AN6050
AN6552
AN6914


2SB788
2SD636(Q,R)
2SB641(Q,R)
2SB709(Q,R)
2SD662(Q,R)
2SD662(R)
2SB793A
2SD973A
2SD601(Q,R)
2SC1684(Q,R)
2SD669A
2SC1565A
2SA1018(Q,R)
MA165
MZL306B
1S954
OA90
MA27WA
MA1068-L
ERB28-04D

DEFLECTION CIRCUIT BOARD (VEPW0189)

NOTES
1. ⊣⊢Ⓝ NON POLARITY CAPACITOR
2. ⊣⊢Ⓣ TANTALUM CAPACITOR
3. ⊣⊢Ⓜ MYLAR CAPACITOR


P601
1 TARGET
2 GND
3 +9V
P602
1 THERMISTOR
2 V COIL
3 V COIL
4 H COIL
5 H COIL
6 GND
P603
1 GND
2 +B
P604
1 V PULSE
2 CHARACTER
3 H PULSE
4 E.EⒽ
5 GND
6 FADE LED
P605
1 H DRIVE
2 NTSC
3 GND
4 V OUT
5 V OUT
6 9V
7 FADE LED
P606
1 Q6200(C)
2 Q6200(E)
3 Q6200(B)
P607
1 AF(12V)
2 GND
3 5V
P608
1 SID
2 GND
3 SCK
4 12V
5 PAUSE SIGNAL
P609
1 GND
2 STANDBY
P610
1 B +5V
2 PAUSE
3 SCK
4 GND
5 SIO
6 STANDBY
7 9V
P611
1 GND
2 NTSC EVF
3 IRIS INDICATOR
P612
1 ABO
2 IMAGE LUG CORRECT
3 DARK SD
4 DARK SD
5 COLOR SD(R)
6 COLOR SD(R)
7 COLOR SD(B)
8 COLOR SD(B)
BR603 100KB
BR602 100KB
BR601 2KB
H-CENT
H-SIZE
H-LIN
V-SIZE
V-CENT
IRIS INDICATOR
DARK SHADING H
DARK SHADING V
ABO
FOCUS
BEAM CURRENT
BIAS CURRENT
TARGET VOLTAGE
H-OSC
V-OSC
IC601 AN6050
IC602 AN-374P
IC603 AN2510S
IC604 AN6552
IC605 AN6552
IC606 AN6914
F.B.T T601
SW601
A
B
C
D
E
F
G
H
I

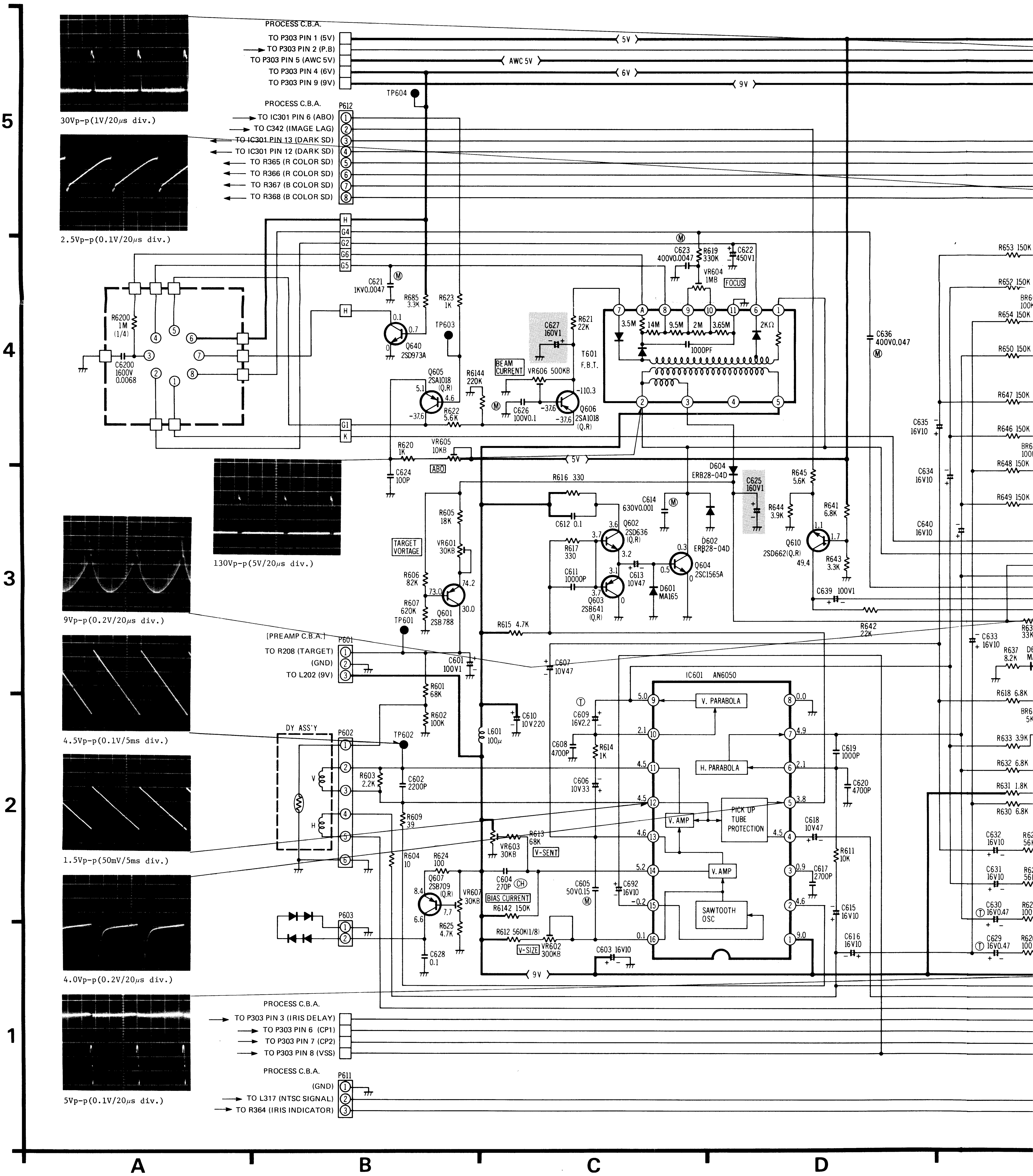
Schematic Diagram

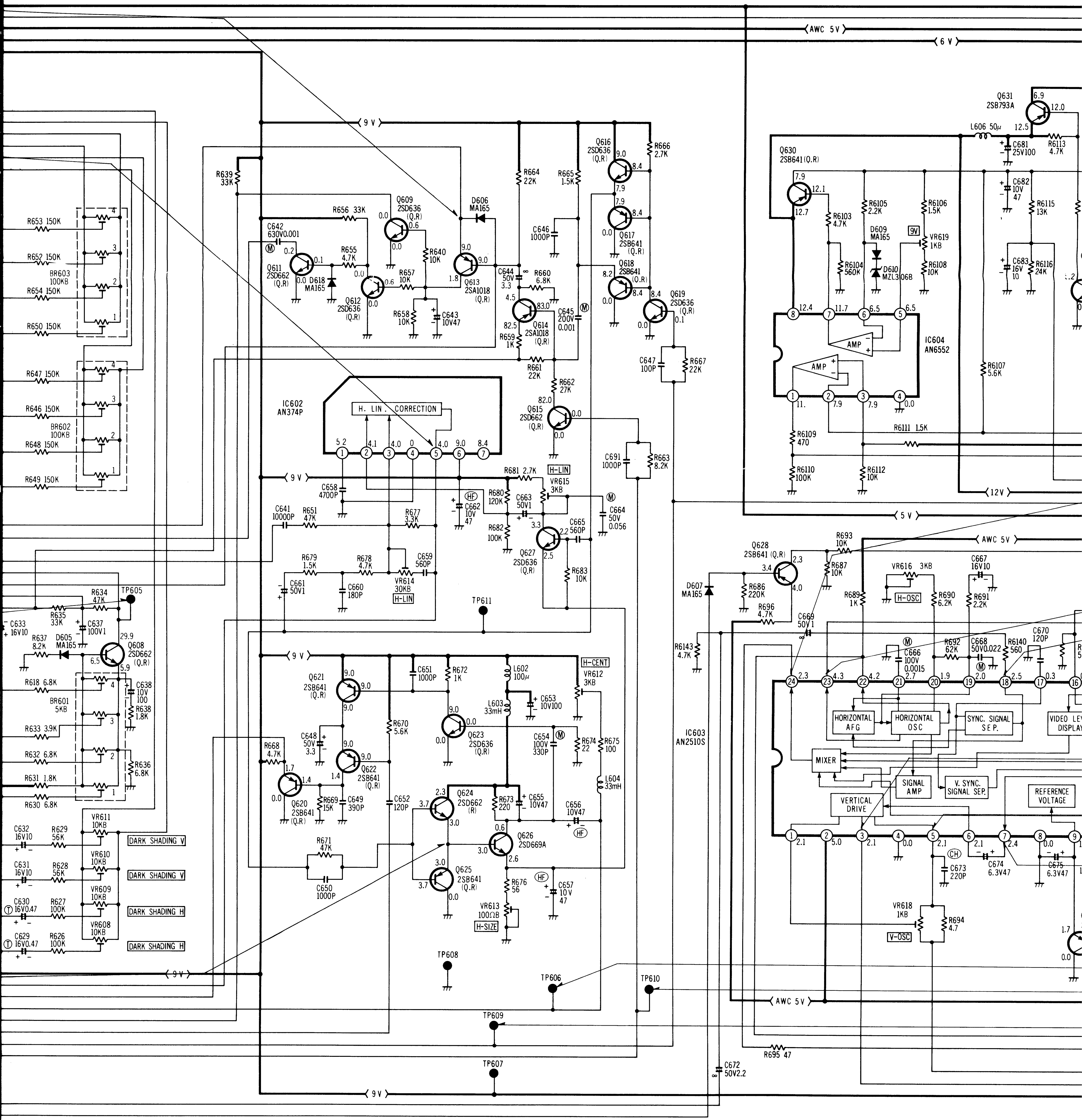
VR601	TARGET VOLTAGE	B–3
VR602	V – SIZE	C–1
VR603	V – CENT	C–2
VR604	FOCUS	C–4
VR605	ABO	B–3
VR606	BEAM CURRENT	C–4
VR607	BIAS CURRENT	B–2
VR608	DARK SHADING H	E–1
VR609	DARK SHADING H	E–1
VR610	DARK SHADING V	E–2
VR611	DARK SHADING V	E–2
VR612	H – CENT	G–2
VR613	H – SIZE	G–1
VR614	H – LIN	F–3
VR615	H -- LIN	G–3
VR616	H – OSC	H–3
VR617	IRIS INDICATOR	I–3
VR618	V -- OSC	H–3
VR619	9V	H–4

Circuit Board

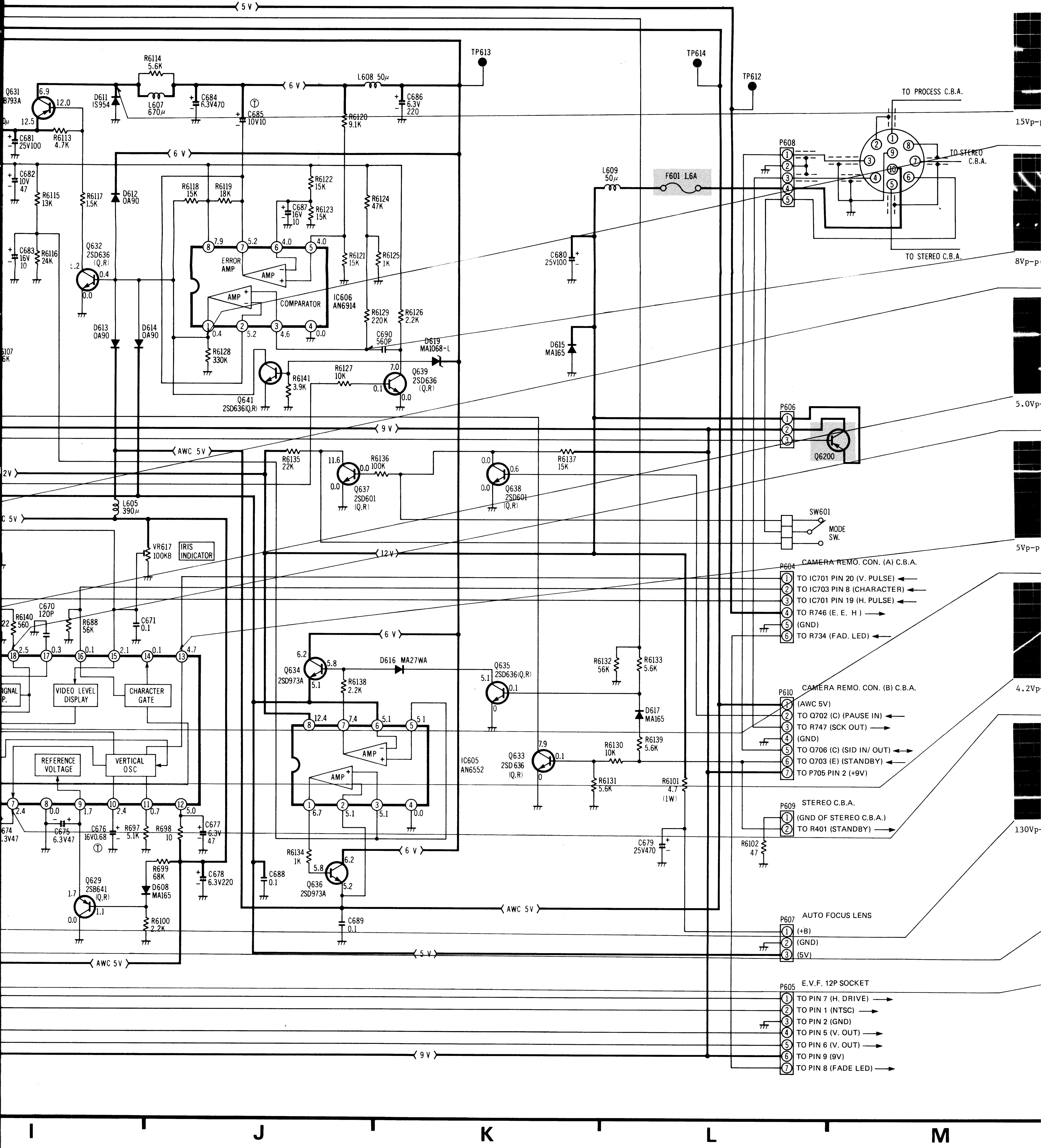
IC601	F-4	D601	F-3
IC602	D-3	D602	F-2
IC603	B-3	D604	F-2
IC604	I-2	D605	I-4
IC605	I-4	D606	E-3
IC606	C-4	D607	D-3
		D608	C-2
Q601	E-1	D609	H-3
Q602	G-3	D610	H-3
Q603	F-3	D611	D-5
Q604	F-3	D612	D-4
Q605	H-1	D613	D-4
Q606	H-2	D614	D-4
Q607	D-1	D615	D-2
Q608	H-4	D616	I-4
Q609	E-3	D617	H-3
Q610	H-3	D618	E-2
Q611	E-2	D619	C-4
Q612	E-2		
Q613	E-3	BR601	H-5
Q614	E-2	BR602	G-5
Q615	E-2	BR603	F-5
Q616	D-2		
Q617	E-2	VR601	F-1
Q618	E-2	VR602	G-4
Q619	E-1	VR603	G-4
Q620	F-4	VR604	G-1
Q621	E-4	VR605	H-2
Q622	E-5	VR606	G-2
Q623	E-4	VR607	E-1
Q624	E-4	VR608	H-5
Q625	E-4	VR609	H-4
Q626	E-4	VR610	H-4
Q627	E-3	VR611	H-4
Q628	C-3	VR612	E-5
Q629	C-2	VR613	E-4
Q630	I-3	VR614	D-2
Q631	D-4	VR615	D-3
Q632	D-4	VR616	B-2
Q633	H-2	VR617	C-3
Q634	H-3	VR618	B-2
Q635	I-4	VR619	H-3
Q636	I-3		
Q637	D-1		
Q638	C-1		
Q639	B-4		
Q649	H-2		
Q641	C-4		

DEFLECTION SCHEMATIC DIAGRAM


30Vp-p(1V/20μs div.)
2.5Vp-p(0.1V/20μs div.)
130Vp-p(5V/20μs div.)
9Vp-p(0.2V/20μs div.)
4.5Vp-p(0.1V/5ms div.)
1.5Vp-p(50mV/5ms div.)
4.0Vp-p(0.2V/20μs div.)
5Vp-p(0.1V/20μs div.)
PROCESS C.B.A.
TO P303 PIN 1 (5V)
TO P303 PIN 2 (P.B)
TO P303 PIN 5 (AWC 5V)
TO P303 PIN 4 (6V)
TO P303 PIN 9 (9V)
5V
AWC 5V
6V
9V
TP604
P612
TO IC301 PIN 6 (ABO)
TO C342 (IMAGE LAG)
TO IC301 PIN 13 (DARK SD)
TO IC301 PIN 12 (DARK SD)
TO R365 (R COLOR SD)
TO R366 (R COLOR SD)
TO R367 (B COLOR SD)
TO R368 (B COLOR SD)
H
G4
G2
G6
G5
G1
K
R6200 1M (1/4)
C6200 1600V 0.0068
C621 1KV0.0047
R685 3.3K
R623 1K
Q640 2SD973A
TP603
Q605 2SA1018 (Q.R)
R622 5.6K
R6144 220K
BEAM CURRENT
VR606 500KB
C626 100V0.1
Q606 2SA1018 (Q.R)
C627 160V1
R621 22K
T601 F.B.T.
C623 400V0.0047
R619 330K
C622 450V1
VR604 1MB
FOCUS
3.5M
14M
9.5M
2M
3.65M
2KΩ
1000PF
R620 1K
VR605 10KB
ABO
C624 100P
D604 ERB28-04D
C625 160V1
R645 5.6K
R644 3.9K
R641 6.8K
Q610 2SD662(Q.R)
R643 3.3K
C639 100V1
R642 22K
C636 400V0.047
R616 330
C614 630V0.001
C612 0.1
Q602 2SD636 (Q.R)
R617 330
C611 10000P
C613 10V47
Q603 2SB641 (Q.R)
D601 MA165
D602 ERB28-04D
Q604 2SC1565A
R605 18K
TARGET VORTAGE
VR601 30KB
R606 82K
R607 620K
TP601
Q601 2SB788
R615 4.7K
[PREAMP C.B.A.]
P601
TO R208 (TARGET)
(GND)
TO L202 (9V)
C601 100V1
C607 10V47
R601 68K
R602 100K
C610 10V220
L601 100μ
DY ASS'Y
P602
TP602
R603 2.2K
C602 2200P
R609 39
R604 10
R624 100
Q607 2SB709 (Q.R)
VR607 30KB
R625 4.7K
C628 0.1
VR603 30KB
R613 68K
V-SENT
C604 270P
CH
BIAS CURRENT
R6142 150K
R612 560K(1/8)
V-SIZE
VR602 300KB
C603 16V10
P603
IC601 AN6050
V. PARABOLA
H. PARABOLA
V. AMP
PICK UP TUBE PROTECTION
SAWTOOTH OSC
C609 16V2.2
C608 4700P
R614 1K
C606 10V33
C605 50V0.15
C692 16V10
C619 1000P
C620 4700P
C618 10V47
R611 10K
C617 2700P
C615 16V10
C616 16V10
R653 150K
R652 150K
R654 150K
R650 150K
R647 150K
R646 150K
R648 150K
R649 150K
C635 16V10
C634 16V10
C640 16V10
C633 16V10
R637 8.2K
R618 6.8K
R633 3.9K
R632 6.8K
R631 1.8K
R630 6.8K
C632 16V10
C631 16V10
C630 16V0.47
C629 16V0.47
PROCESS C.B.A.
TO P303 PIN 3 (IRIS DELAY)
TO P303 PIN 6 (CP1)
TO P303 PIN 7 (CP2)
TO P303 PIN 8 (VSS)
P611
(GND)
TO L317 (NTSC SIGNAL)
TO R364 (IRIS INDICATOR)
5
4
3
2
1
A
B
C
D


AWC 5V
6V
9V
12V
5V
AWC 5V
Q631 2SB793A
L606 50μ
C681 25V100
R6113 4.7K
C682 10V 47
R6115 13K
C683 16V 10
R6116 24K
R6107 5.6K
Q630 2SB641(Q.R)
R6103 4.7K
R6105 2.2K
R6106 1.5K
D609 MA165
VR619 1KB
9V
R6104 560K
D610 MZL3.06B
R6108 10K
IC604 AN6552
AMP
AMP
R6109 470
R6111 1.5K
R6110 100K
R6112 10K
R653 150K
R652 150K
BR603 100KB
R654 150K
R650 150K
R647 150K
R646 150K
BR602 100KB
R648 150K
R649 150K
R639 33K
C642 630V0.001
Q611 2SD662 (Q.R)
D618 MA165
R656 33K
R655 4.7K
Q609 2SD636 (Q.R)
Q612 2SD636 (Q.R)
R640 10K
R657 10K
R658 10K
C643 10V47
D606 MA165
Q613 2SA1018 (Q.R)
C644 50V 3.3
R660 6.8K
Q614 2SA1018 (Q.R)
R659 1K
R661 22K
R664 22K
R665 1.5K
C646 1000P
C645 200V 0.001
R662 27K
Q615 2SD662 (Q.R)
H-LIN
Q616 2SD636 (Q.R)
R666 2.7K
Q617 2SB641 (Q.R)
Q618 2SB641 (Q.R)
Q619 2SD636 (Q.R)
C647 100P
R667 22K
C691 1000P
R663 8.2K
IC602 AN374P
H. LIN. CORRECTION
C658 4700P
R681 2.7K
R680 120K
C663 50V1
VR615 3KB
C662 10V 47
HF
C664 50V 0.056
C641 10000P
R651 47K
R677 3.3K
R682 100K
C665 560P
Q627 2SD636 (Q.R)
R683 10K
R679 1.5K
R678 4.7K
C659 560P
VR614 30KB
H-LIN
C661 50V1
C660 180P
TP611
TP605
R634 47K
R635 33K
C633 16V10
C637 100V1
R637 8.2K
D605 MA165
Q608 2SD662 (Q.R)
R618 6.8K
BR601 5KB
C638 10V 100
R638 1.8K
R633 3.9K
R632 6.8K
R636 6.8K
R631 1.8K
R630 6.8K
Q621 2SB641 (Q.R)
C651 1000P
R672 1K
L602 100μ
H-CENT
VR612 3KB
L603 33mH
C653 10V100
R670 5.6K
Q623 2SD636 (Q.R)
C648 50V 3.3
R668 4.7K
Q622 2SB641 (Q.R)
C654 100V 330P
R674 22
R675 100
L604 33mH
Q620 2SB641 (Q.R)
R669 15K
C649 390P
C652 120P
Q624 2SD662 (R)
R673 220
C655 10V47
C656 10V47
R671 47K
Q626 2SD669A
C650 1000P
Q625 2SB641 (Q.R)
R676 56
C657 10V 47
VR613 100ΩB
H-SIZE
TP608
TP606
TP610
TP609
TP607
C632 16V10
R629 56K
VR611 10KB
DARK SHADING V
C631 16V10
R628 56K
VR610 10KB
DARK SHADING V
C630 16V0.47
R627 100K
VR609 10KB
DARK SHADING H
C629 16V0.47
R626 100K
VR608 10KB
DARK SHADING H
Q628 2SB641 (Q.R)
R693 10K
R687 10K
D607 MA165
R686 220K
R696 4.7K
VR616 3KB
C667 16V10
R689 1K
H-OSC
R690 6.2K
R691 2.2K
C669 50V1
R6143 4.7K
C666 100V 0.0015
R692 62K
C668 50V0.022
R6140 560
C670 120P
IC603 AN2510S
HORIZONTAL AFG
HORIZONTAL OSC
SYNC. SIGNAL SEP.
VIDEO LE DISPLA
MIXER
SIGNAL AMP
V. SYNC. SIGNAL SEP.
REFERENCE VOLTAGE
VERTICAL DRIVE
C673 220P
C674 6.3V47
C675 6.3V47
VR618 1KB
R694 4.7
V-OSC
R695 47
C672 50V2.2
E
F
G
H
I

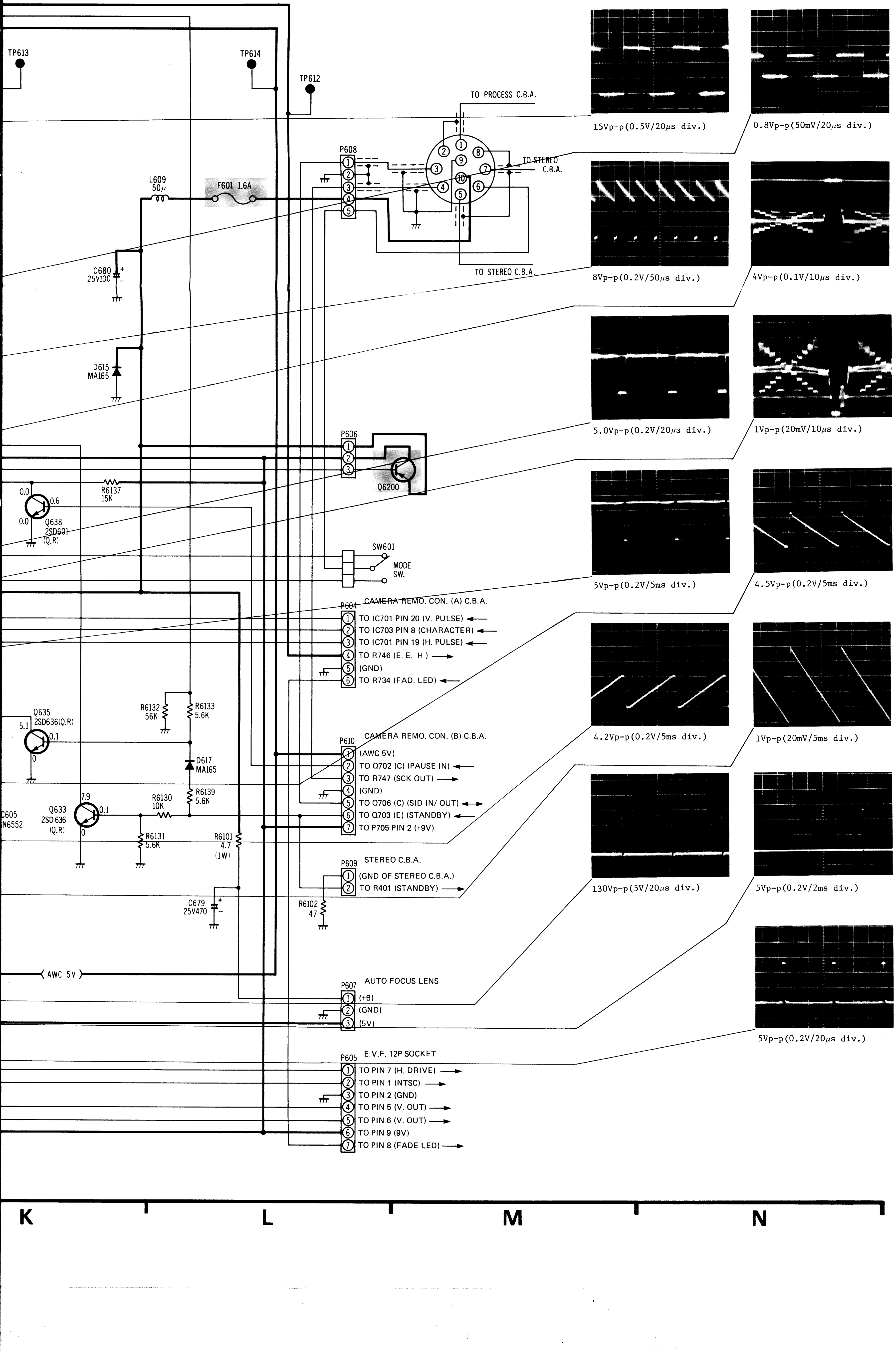
Th
fo
is
ne



5 V
6 V
9 V
12 V
AWC 5 V
TP613
TP614
TP612
Q631 2SB793A
R6114 5.6K
L607 670μ
D611 IS954
C684 6.3V470
C685 10V10
L608 50μ
C686 6.3V 220
R6120 9.1K
C681 25V100
R6113 4.7K
C682 10V 47
R6115 13K
R6117 1.5K
D612 OA90
R6118 15K
R6119 18K
R6122 15K
C687 16V 10
R6123 15K
R6124 47K
C683 16V 10
R6116 24K
Q632 2SD636 (Q.R)
ERROR AMP
AMP
COMPARATOR
IC606 AN6914
R6121 15K
R6125 1K
R6129 220K
R6126 2.2K
D613 OA90
D614 OA90
R6128 330K
C690 560P
D619 MA1068-L
R6127 10K
R6141 3.9K
Q641 2SD636(Q.R)
Q639 2SD636 (Q.R)
L609 50μ
F601 1.6A
C680 25V100
D615 MA165
TO PROCESS C.B.A.
TO STEREO C.B.A.
P608
15Vp-p
8Vp-p
5.0Vp-p
5Vp-p
4.2Vp-p
130Vp-p
P606
Q6200
R6135 22K
R6136 100K
Q637 2SD601 (Q.R)
Q638 2SD601 (Q.R)
R6137 15K
L605 390μ
VR617 100KB
IRIS INDICATOR
SW601
MODE SW.
C670 120P
R6140 560
R688 56K
C671 0.1
VIDEO LEVEL DISPLAY
CHARACTER GATE
REFERENCE VOLTAGE
VERTICAL OSC
C675 6.3V47
C676 16V0.68
R697 5.1K
R698 10
C677 6.3V 47
R699 68K
D608 MA165
C678 6.3V220
Q629 2SB641 (Q.R)
R6100 2.2K
Q634 2SD973A
D616 MA27WA
R6138 2.2K
Q635 2SD636(Q.R)
IC605 AN6552
R6134 1K
Q636 2SD973A
C688 0.1
C689 0.1
R6132 56K
R6133 5.6K
D617 MA165
Q633 2SD 636 (Q.R)
R6130 10K
R6139 5.6K
R6131 5.6K
R6101 4.7 (1W)
C679 25V470
R6102 47
P604 CAMERA REMO. CON. (A) C.B.A.
① TO IC701 PIN 20 (V. PULSE)
② TO IC703 PIN 8 (CHARACTER)
③ TO IC701 PIN 19 (H. PULSE)
④ TO R746 (E. E. H)
⑤ (GND)
⑥ TO R734 (FAD. LED)
P610 CAMERA REMO. CON. (B) C.B.A.
① (AWC 5V)
② TO Q702 (C) (PAUSE IN)
③ TO R747 (SCK OUT)
④ (GND)
⑤ TO Q706 (C) (SID IN/ OUT)
⑥ TO Q703 (E) (STANDBY)
⑦ TO P705 PIN 2 (+9V)
P609 STEREO C.B.A.
① (GND OF STEREO C.B.A.)
② TO R401 (STANDBY)
P607 AUTO FOCUS LENS
① (+B)
② (GND)
③ (5V)
P605 E.V.F. 12P SOCKET
① TO PIN 7 (H. DRIVE)
② TO PIN 1 (NTSC)
③ TO PIN 2 (GND)
④ TO PIN 5 (V. OUT)
⑤ TO PIN 6 (V. OUT)
⑥ TO PIN 9 (9V)
⑦ TO PIN 8 (FADE LED)
I
J
K
L
M

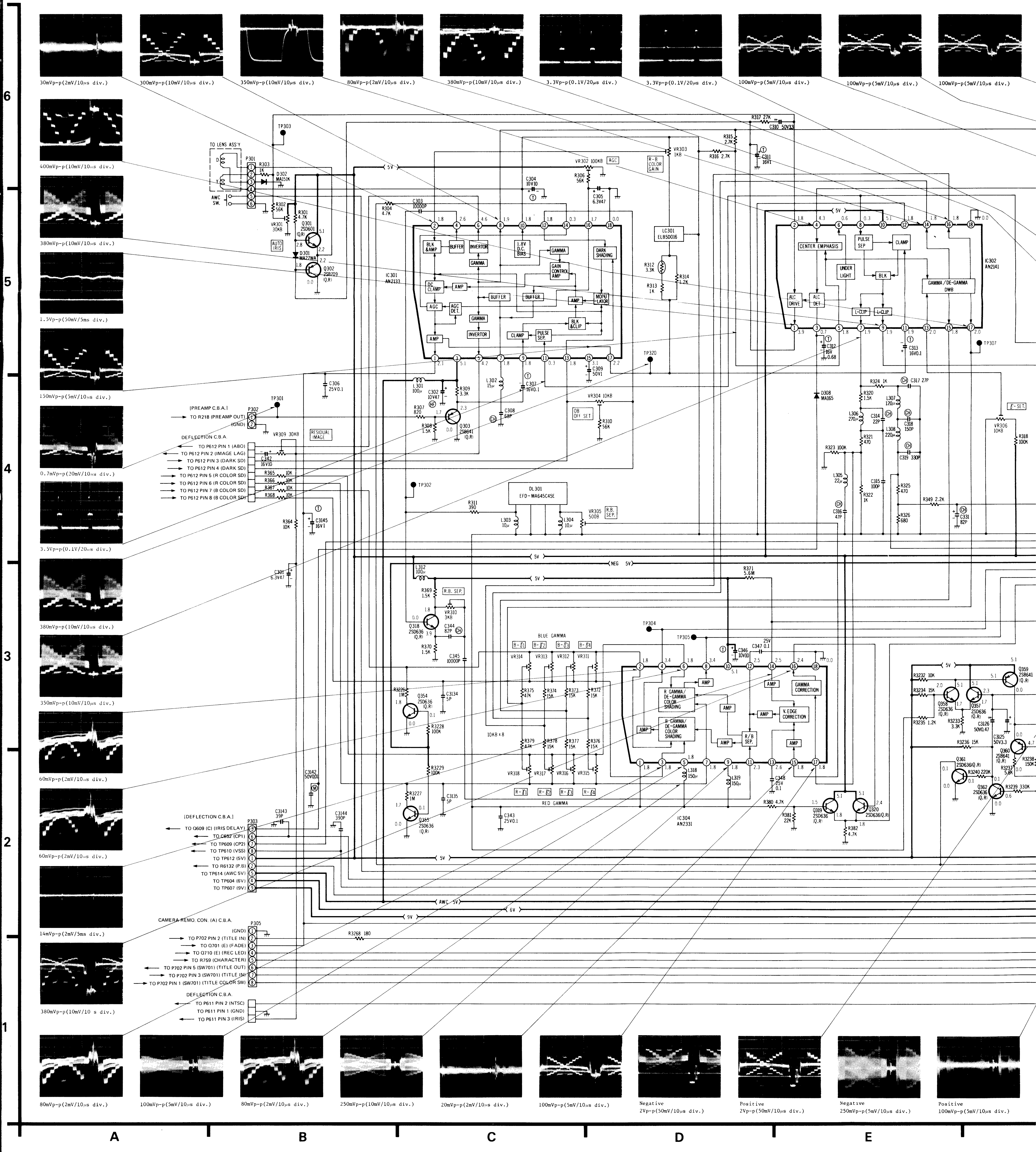
PRODUCT SAFETY NOTE

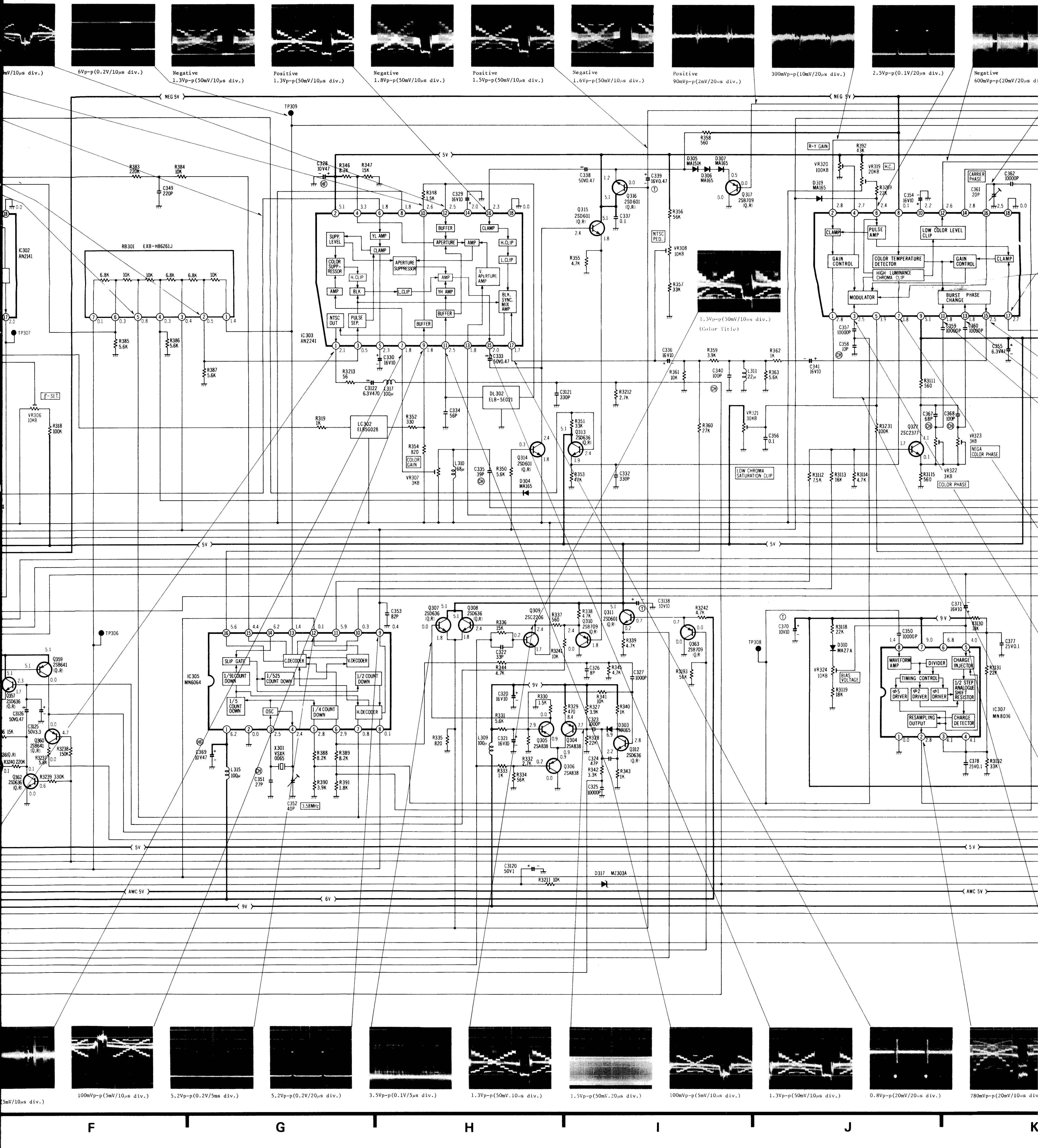
The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards when servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.



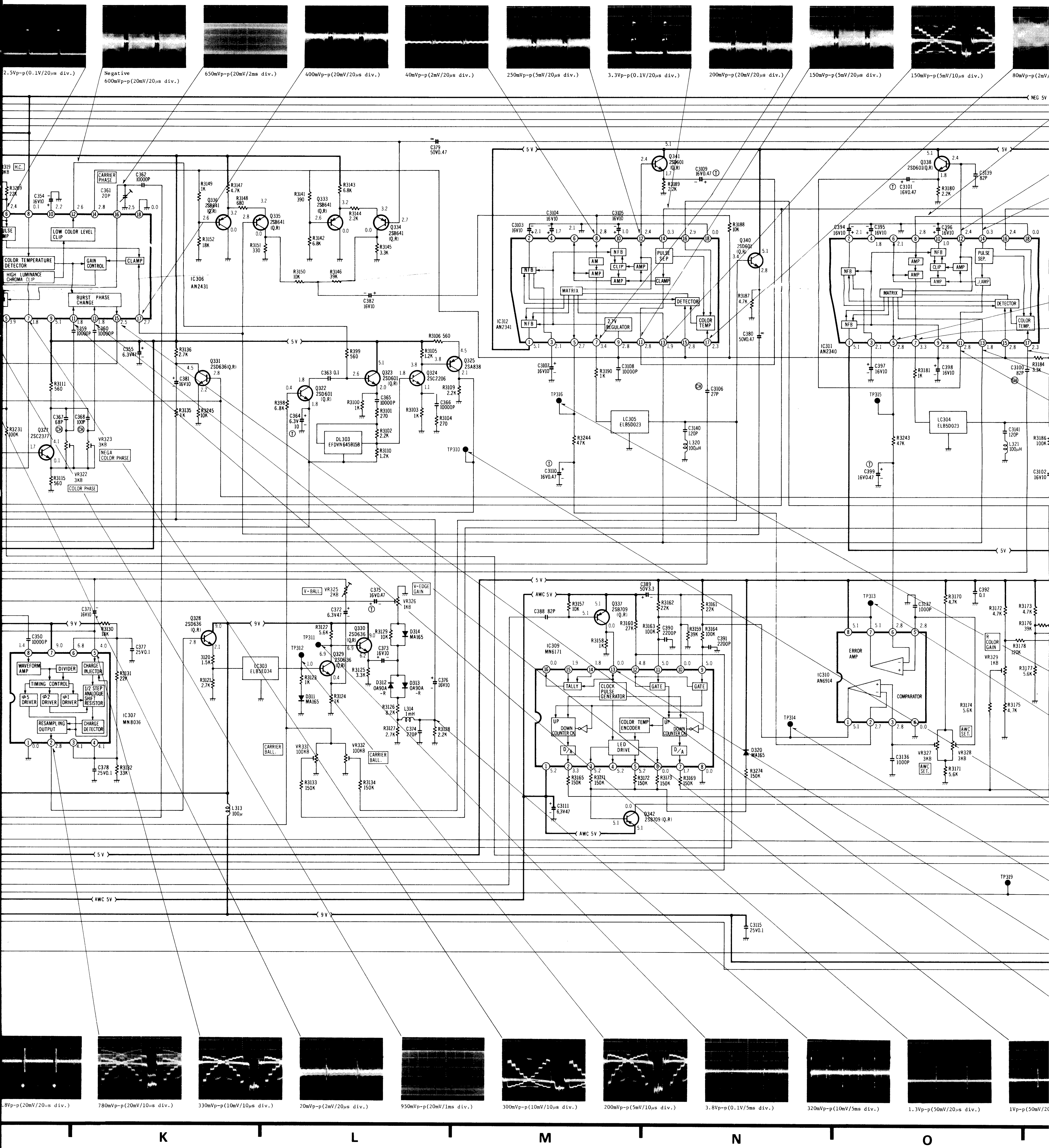
TP613
TP614
TP612
TO PROCESS C.B.A.
P608
TO STEREO C.B.A.
TO STEREO C.B.A.
L609 50μ
F601 1.6A
C680 25V100
D615 MA165
P606
Q6200
R6137 15K
0.0
0.6
0.0
Q638 2SD601 (Q.R)
SW601
MODE SW.
P604 CAMERA REMO. CON. (A) C.B.A.
① TO IC701 PIN 20 (V. PULSE)
② TO IC703 PIN 8 (CHARACTER)
③ TO IC701 PIN 19 (H. PULSE)
④ TO R746 (E. E. H)
⑤ (GND)
⑥ TO R734 (FAD. LED)
Q635 2SD636(Q.R)
5.1
0.1
0
R6132 56K
R6133 5.6K
D617 MA165
R6139 5.6K
P610 CAMERA REMO. CON. (B) C.B.A.
① (AWC 5V)
② TO Q702 (C) (PAUSE IN)
③ TO R747 (SCK OUT)
④ (GND)
⑤ TO Q706 (C) (SID IN/ OUT)
⑥ TO Q703 (E) (STANDBY)
⑦ TO P705 PIN 2 (+9V)
C605
N6552
Q633 2SD 636 (Q.R)
7.9
0.1
0
R6130 10K
R6131 5.6K
R6101 4.7 (1W)
P609 STEREO C.B.A.
① (GND OF STEREO C.B.A.)
② TO R401 (STANDBY)
C679 25V470
R6102 47
AWC 5V
P607 AUTO FOCUS LENS
① (+B)
② (GND)
③ (5V)
P605 E.V.F. 12P SOCKET
① TO PIN 7 (H. DRIVE)
② TO PIN 1 (NTSC)
③ TO PIN 2 (GND)
④ TO PIN 5 (V. OUT)
⑤ TO PIN 6 (V. OUT)
⑥ TO PIN 9 (9V)
⑦ TO PIN 8 (FADE LED)
15Vp-p(0.5V/20μs div.)
0.8Vp-p(50mV/20μs div.)
8Vp-p(0.2V/50μs div.)
4Vp-p(0.1V/10μs div.)
5.0Vp-p(0.2V/20μs div.)
1Vp-p(20mV/10μs div.)
5Vp-p(0.2V/5ms div.)
4.5Vp-p(0.2V/5ms div.)
4.2Vp-p(0.2V/5ms div.)
1Vp-p(20mV/5ms div.)
130Vp-p(5V/20μs div.)
5Vp-p(0.2V/2ms div.)
5Vp-p(0.2V/20μs div.)
K
L
M
N

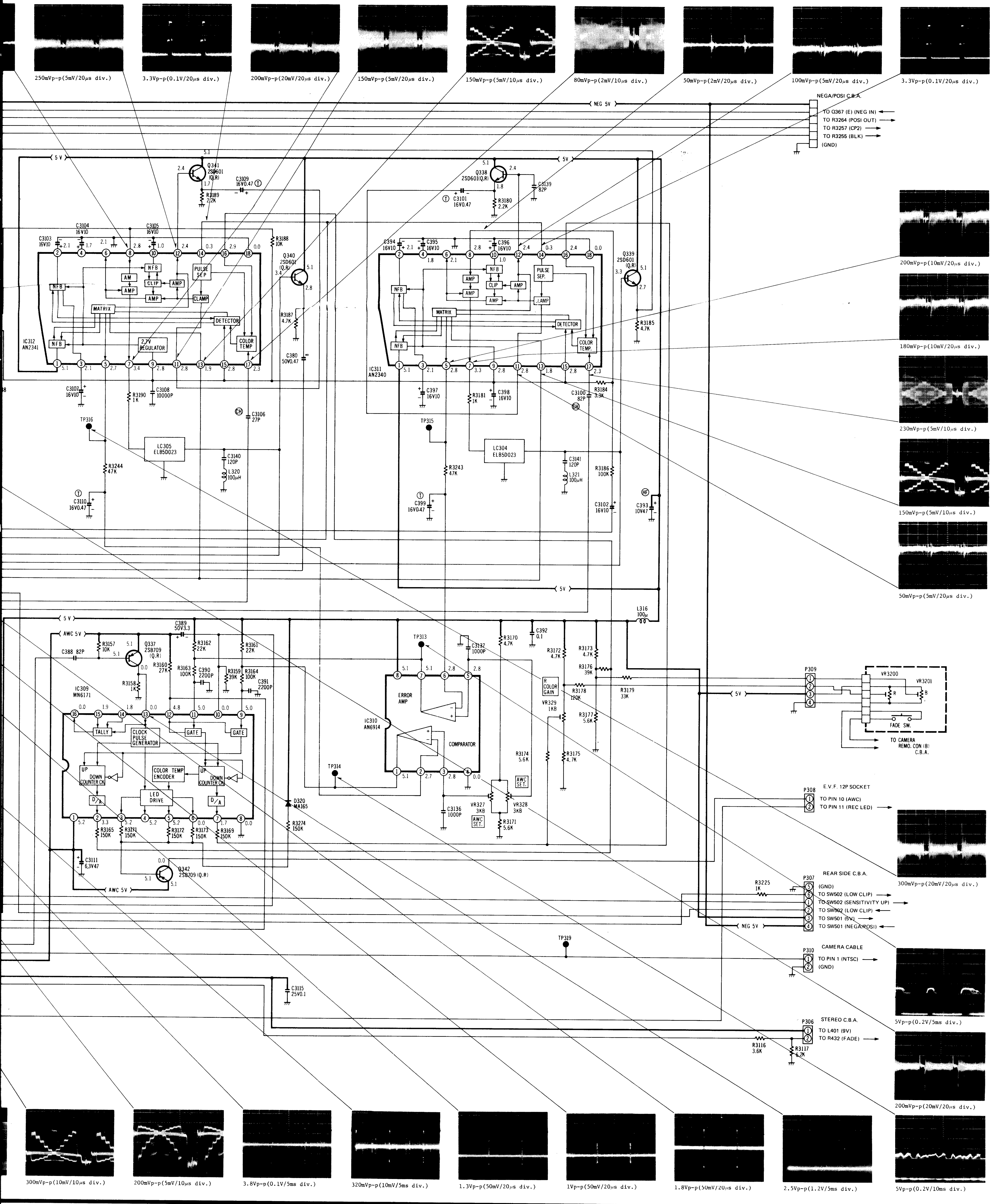
PROCESS SCHEMATIC DIAGRAM


30mVp-p(2mV/10μs div.)
300mVp-p(10mV/10μs div.)
350mVp-p(10mV/10μs div.)
80mVp-p(2mV/10μs div.)
380mVp-p(10mV/10μs div.)
3.3Vp-p(0.1V/20μs div.)
3.3Vp-p(0.1V/20μs div.)
100mVp-p(5mV/10μs div.)
100mVp-p(5mV/10μs div.)
100mVp-p(5mV/10μs div.)
400mVp-p(10mV/10μs div.)
380mVp-p(10mV/10μs div.)
1.5Vp-p(50mV/5ms div.)
150mVp-p(5mV/10μs div.)
0.7mVp-p(20mV/10μs div.)
3.5Vp-p(0.1V/20μs div.)
380mVp-p(10mV/10μs div.)
350mVp-p(10mV/10μs div.)
60mVp-p(2mV/10μs div.)
60mVp-p(2mV/10μs div.)
14mVp-p(2mV/5ms div.)
380mVp-p(10mV/10 s div.)
80mVp-p(2mV/10μs div.)
100mVp-p(5mV/10μs div.)
80mVp-p(2mV/10μs div.)
250mVp-p(10mV/10μs div.)
20mVp-p(2mV/10μs div.)
100mVp-p(5mV/10μs div.)
Negative 2Vp-p(50mV/10μs div.)
Positive 2Vp-p(50mV/10μs div.)
Negative 250mVp-p(5mV/10μs div.)
Positive 100mVp-p(5mV/10μs div.)
TO LENS ASS'Y
AWC SW.
P301
TP303
D302 MA151K
Q301 2SD601 (Q,R)
D301 MA27WA
Q302 2SB709 (Q,R)
AUTO IRIS
VR301 30KB
IC301 AN2133
BLK &AMP
BUFFER
INVERTOR
GAMMA
1.8V D.C. BIAS
DARK SHADING
GAIN CONTROL AMP
DC CLAMP
AMP
AGC
AGC DET.
BUFFER
MONI-LATOR
BLK &CLIP
CLAMP
PULSE SEP.
VR302 100KB AGC
R-B COLOR GAIN
VR303 1KB
LC301 ELB5D016
IC302 AN2141
CENTER EMPHASIS
PULSE SEP
CLAMP
UNDER LIGHT
BLK
ALC DRIVE
ALC DET
L-CLIP
GAMMA/DE-GAMMA DWB
TP307
TP320
TP301
TP302
[PREAMP C.B.A.]
P302
TO R218 (PREAMP OUT)
(GND)
DEFLECTION C.B.A.
TO P612 PIN 1 (ABO)
TO P612 PIN 2 (IMAGE LAG)
TO P612 PIN 3 (DARK SD)
TO P612 PIN 4 (DARK SD)
TO P612 PIN 5 (R COLOR SD)
TO P612 PIN 6 (R COLOR SD)
TO P612 PIN 7 (B COLOR SD)
TO P612 PIN 8 (B COLOR SD)
RESIDUAL IMAGE
Q303 2SB641 (Q,R)
OB OFF SET
VR304 10KB
Q308 MA165
DL301 EFD-MA645C45E
VR305 500B R.B. SEP.
5V
NEG 5V
Q318 2SD636 (Q,R)
VR310 3KB
R.B. SEP.
TP304
TP305
BLUE GAMMA
B-γ1 B-γ2 B-γ3 B-γ4
VR314 VR313 VR312 VR311
10KB × 8
VR318 VR317 VR316 VR315
R-γ1 R-γ2 R-γ3 R-γ4
RED GAMMA
IC304 AN2331
R GAMMA/DE-GAMMA COLOR SHADING
B GAMMA/DE-GAMMA COLOR SHADING
GAMMA CORRECTION
V.EDGE CORRECTION
R/B SEP.
Q354 2SD636 (Q,R)
Q355 2SD636 (Q,R)
Q319 2SD636 (Q,R)
Q320 2SD636 (Q,R)
Q359 2SB641 (Q,R)
Q358 2SD636 (Q,R)
Q357 2SD636 (Q,R)
Q360 2SB641 (Q,R)
Q361 2SD636 (Q,R)
Q362 2SD636 (Q,R)
[DEFLECTION C.B.A.]
P303
TO Q609 (C) (IRIS DELAY)
TO C652 (CP1)
TO TP609 (CP2)
TO TP610 (VSS)
TO TP612 (5V)
TO R6132 (P.B)
TO TP614 (AWC 5V)
TO TP604 (6V)
TO TP607 (9V)
AWC 5V
6V
9V
CAMERA REMO. CON. (A) C.B.A.
P305
(GND)
TO P702 PIN 2 (TITLE IN)
TO Q701 (E) (FADE)
TO Q710 (E) (REC LED)
TO R759 (CHARACTER)
TO P702 PIN 5 (SW701) (TITLE OUT)
TO P702 PIN 3 (SW701) (TITLE IN)
TO P702 PIN 1 (SW701) (TITLE COLOR SW)
DEFLECTION C.B.A.
TO P611 PIN 2 (NTSC)
TO P611 PIN 1 (GND)
TO P611 PIN 3 (IRIS)
γ-SET
6
5
4
3
2
1
A
B
C
D
E



mV/10μs div.)
6Vp-p(0.2V/10μs div.)
Negative 1.3Vp-p(50mV/10μs div.)
Positive 1.3Vp-p(50mV/10μs div.)
Negative 1.8Vp-p(50mV/10μs div.)
Positive 1.5Vp-p(50mV/10μs div.)
Negative 1.6Vp-p(50mV/10μs div.)
Positive 90mVp-p(2mV/20μs div.)
300mVp-p(10mV/20μs div.)
2.5Vp-p(0.1V/20μs div.)
Negative 600mVp-p(20mV/20μs d
NEG 5V
TP309
IC302 AN2141
RB301 EXB-H86261J
IC303 AN2241
SUPP. LEVEL
COLOR SUPPRESSOR
YL AMP
CLAMP
APERTURE SUPPRESSOR
BUFFER
APERTURE
AMP
H.CLIP
L.CLIP
V. APERTURE AMP
BLK. SYNC. MIX AMP
YH AMP
BLK
NTSC OUT
PULSE SEP.
DL302 ELB-5E021
LC302 ELB5G028
COLOR GAIN
VR306 10KB
γ-SET
TP307
Q315 2SD601
Q316 2SD601
Q317 2SB709
Q313 2SD636
Q314 2SD601
D304 MA165
D305 MA151K
D306 MA165
D307 MA165
NTSC PED.
VR308 10KB
1.5Vp-p(50mV/10μs div.) (Color Title)
LOW CHROMA SATURATION CLIP
VR321 30KB
R-Y GAIN
VR320 100KB
VR319 H.C. 20KB
D319 MA165
CARRIER PHASE
CLAMP
PULSE AMP
LOW COLOR LEVEL CLIP
GAIN CONTROL
COLOR TEMPERATURE DETECTOR
HIGH LUMINANCE CHROMA CLIP
MODULATOR
BURST PHASE CHANGE
Q327 2SC2377
VR322 3KB
VR323 3KB
NEGA COLOR PHASE
COLOR PHASE
5V
TP306
Q359 2SB641
Q357 2SD636
Q360 2SB641
Q362 2SD636
IC305 MN6064
SLIP GATE
C.DECODER
V.DECODER
1/91 COUNT DOWN
1/525 COUNT DOWN
1/2 COUNT DOWN
1/5 COUNT DOWN
OSC
1/4 COUNT DOWN
H.DECODER
X301 VSXK 0065
3.58MHz
Q307 2SD636
Q308 2SD636
Q309 2SC2206
Q310 2SB709
Q311 2SD601
Q363 2SB709
Q305 2SA838
Q304 2SA838
Q306 2SA838
Q312 2SD636
D303 MA165
D317 MZ303A
TP308
D310 MA27A
VR324 10KB
BIAS VOLTAGE
IC307 MN8036
WAVEFORM AMP
DIVIDER
CHARGE INJECTOR
TIMING CONTROL
φ5 DRIVER
φ2 DRIVER
φ1 DRIVER
1/2 STEP ANALOGUE SHIFT RESISTOR
RESAMPLING OUTPUT
CHARGE DETECTOR
9V
6V
AWC 5V
5mV/10μs div.)
100mVp-p(5mV/10μs div.)
5.2Vp-p(0.2V/5ms div.)
5.2Vp-p(0.2V/20μs div.)
3.5Vp-p(0.1V/5μs div.)
1.3Vp-p(50mV/10μs div.)
1.5Vp-p(50mV/20μs div.)
100mVp-p(5mV/10μs div.)
1.3Vp-p(50mV/10μs div.)
0.8Vp-p(20mV/20μs div.)
780mVp-p(20mV/10μs div.)
F
G
H
I
J
K


2.5Vp-p(0.1V/20μs div.)
Negative
600mVp-p(20mV/20μs div.)
650mVp-p(20mV/2ms div.)
400mVp-p(20mV/20μs div.)
40mVp-p(2mV/20μs div.)
250mVp-p(5mV/20μs div.)
3.3Vp-p(0.1V/20μs div.)
200mVp-p(20mV/20μs div.)
150mVp-p(5mV/20μs div.)
150mVp-p(5mV/10μs div.)
80mVp-p(2mV/
NEG 5V
5V
9V
AWC 5V
CARRIER PHASE
LOW COLOR LEVEL CLIP
COLOR TEMPERATURE DETECTOR
HIGH LUMINANCE CHROMA CLIP
GAIN CONTROL
CLAMP
BURST PHASE CHANGE
IC306
AN2431
NEGA COLOR PHASE
COLOR PHASE
DL303
EFDVN645B15B
IC312
AN2341
IC311
AN2340
NFB
AM
AMP
CLIP
PULSE SEP.
MATRIX
DETECTOR
2.7V REGULATOR
COLOR TEMP
LC305
ELB5D023
LC304
ELB5D023
TP316
TP315
TP310
WAVEFORM AMP
DIVIDER
CHARGE INJECTOR
TIMING CONTROL
1/2 STEP ANALOGUE SHIFT RESISTOR
RESAMPLING OUTPUT
CHARGE DETECTOR
IC307
MN8036
V-BALL
V-EDGE GAIN
LC303
ELB5E034
TP311
TP312
CARRIER BALL.
IC309
MN6171
TALLY
CLOCK PULSE GENERATOR
GATE
UP DOWN COUNTER CK
COLOR TEMP ENCODER
LED DRIVE
D/A
IC310
AN6914
ERROR AMP
COMPARATOR
TP313
TP314
TP319
AWC SET.
R COLOR GAIN
.8Vp-p(20mV/20μs div.)
780mVp-p(20mV/10μs div.)
330mVp-p(10mV/10μs div.)
20mVp-p(2mV/20μs div.)
950mVp-p(20mV/1ms div.)
300mVp-p(10mV/10μs div.)
200mVp-p(5mV/10μs div.)
3.8Vp-p(0.1V/5ms div.)
320mVp-p(10mV/5ms div.)
1.3Vp-p(50mV/20μs div.)
1Vp-p(50mV/2
K
L
M
N
O


250mVp-p(5mV/20μs div.)
3.3Vp-p(0.1V/20μs div.)
200mVp-p(20mV/20μs div.)
150mVp-p(5mV/20μs div.)
150mVp-p(5mV/10μs div.)
80mVp-p(2mV/10μs div.)
50mVp-p(2mV/20μs div.)
100mVp-p(5mV/20μs div.)
3.3Vp-p(0.1V/20μs div.)
NEG 5V
NEGA/POSI C.B.A.
TO Q367 (E) (NEG IN)
TO R3264 (POSI OUT)
TO R3257 (CP2)
TO R3256 (BLK)
(GND)
5V
Q341 2SD601 (Q.R)
C3109 16V0.47
R3189 2.2K
Q338 2SD601(Q.R)
C3101 16V0.47
R3180 2.2K
C3139 82P
C3103 16V10
C3104 16V10
C3105 16V10
R3188 10K
C3394 16V10
C3395 16V10
C3396 16V10
Q340 2SD601 (Q.R)
Q339 2SD601 (Q.R)
AM
AMP
NFB
CLIP
PULSE SEP.
CLAMP
MATRIX
DETECTOR
COLOR TEMP.
2.7V REGULATOR
IC312 AN2341
IC311 AN2340
R3187 4.7K
C380 50V0.47
R3185 4.7K
C3107 16V10
R3190 1K
C3108 10000P
C3106 27P
C397 16V10
R3181 1K
C398 16V10
C3100 82P
R3184 3.3K
TP316
TP315
LC305 ELB5D023
LC304 ELB5D023
C3140 120P
L320 100μH
C3141 120P
L321 100μH
R3244 47K
R3243 47K
R3186 100K
C3110 16V0.47
C399 16V0.47
C3102 16V10
C393 10V47
200mVp-p(10mV/20μs div.)
180mVp-p(10mV/20μs div.)
230mVp-p(5mV/10μs div.)
150mVp-p(5mV/10μs div.)
50mVp-p(5mV/20μs div.)
AWC 5V
L316 100μ
C389 50V3.3
R3157 10K
Q337 2SB709 (Q.R)
R3162 22K
R3161 22K
C388 82P
R3160 27K
R3163 100K
C390 2200P
R3159 39K
R3164 100K
C391 2200P
R3158 1K
IC309 MN6171
TALLY
CLOCK PULSE GENERATOR
GATE
UP DOWN COUNTER CK
COLOR TEMP ENCODER
LED DRIVE
D/A
D320 MA165
R3274 150K
R3165 150K
R3171 150K
R3172 150K
R3173 150K
R3169 150K
C3111 6.3V47
Q342 2SB709 (Q.R)
TP313
C3137 1000P
R3170 4.7K
C392 0.1
R3172 4.7K
R3173 4.7K
R3176 39K
R COLOR GAIN
R3178 120K
VR329 1KB
R3177 5.6K
R3179 33K
IC310 AN6914
ERROR AMP
COMPARATOR
TP314
R3174 5.6K
R3175 4.7K
C3136 1000P
VR327 3KB
AWC SET
VR328 3KB
R3171 5.6K
P309
VR3200
VR3201
FADE SW.
TO CAMERA REMO. CON (B) C.B.A.
P308
E.V.F. 12P SOCKET
TO PIN 10 (AWC)
TO PIN 11 (REC LED)
300mVp-p(20mV/20μs div.)
REAR SIDE C.B.A.
P307
R3225 1K
(GND)
TO SW502 (LOW CLIP)
TO SW502 (SENSITIVITY UP)
TO SW502 (LOW CLIP)
TO SW501 (5V)
TO SW501 (NEGA/POSI)
TP319
P310
CAMERA CABLE
TO PIN 1 (NTSC)
(GND)
C3115 25V0.1
5Vp-p(0.2V/5ms div.)
P306
STEREO C.B.A.
TO L401 (9V)
TO R432 (FADE)
R3116 3.6K
R3117 6.2K
200mVp-p(20mV/20μs div.)
300mVp-p(10mV/10μs div.)
200mVp-p(5mV/10μs div.)
3.8Vp-p(0.1V/5ms div.)
320mVp-p(10mV/5ms div.)
1.3Vp-p(50mV/20μs div.)
1Vp-p(50mV/20μs div.)
1.8Vp-p(50mV/20μs div.)
2.5Vp-p(1.2V/5ms div.)
5Vp-p(0.2V/10ms div.)
M
N
O
P
Q

Schematic Diagram

VR301	AUTO IRIS	B–5
VR302	AGC	D–6
VR303	R – B COLOR GAIN	D–6
VR304	OB OFF SET	D–4
VR305	R. B. SEP.	C–4
VR306	γ– SET.	F–4
VR307	COLOR GAIN	H–4
VR308	NTSC PED.	I–5
VR309	RESIDUAL IMAGE	B–4
VR310	R. B. SEP.	C–3
VR311	B – γ4	C–3
VR312	B – γ3	C–3
VR313	B – γ2	C–3
VR314	B – γ1	C–3
VR315	R – γ4	C–2
VR316	R – γ3	C–2
VR317	R – γ2	C–2
VR318	R – γ1	C–2
VR319	H. C.	J–5
VR320	R – Y GAIN	J–6
VR321	LOW CHROMA SATURATION CLIP	I–4
VR322	COLOR PHASE	J–4
VR323	NEGA COLOR PHASE	K–4
VR324	BIAS VOLTAGE	J–3
VR325	V – BALL.	L–3
VR326	V – EDGE GAIN	L–3
VR327	AWC SET	O–3
VR328	AWC SET	O–3
VR329	R COLOR GAIN	O–3
VR331	CARRIER BALL.	L–3
VR332	CARRIER BALL.	L–3
VR3200	R	O–3
VR3201	B	O–3

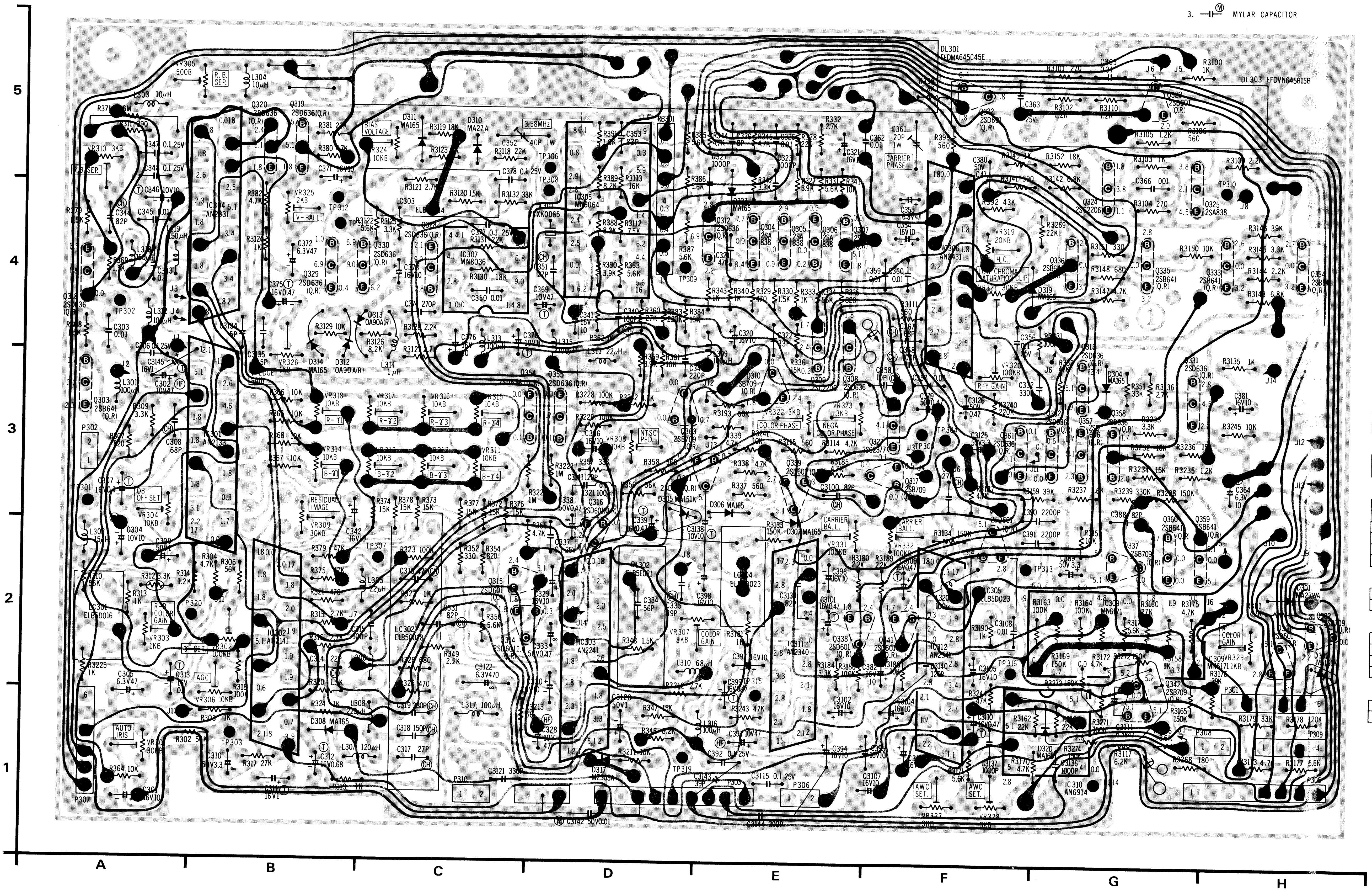
Circuit Board

IC301	B-3	VR301	A-1
IC302	B-2	VR302	B-2
IC303	D-2	VR303	A-2
IC304	B-4	VR304	A-3
IC305	D-4	VR305	A-5
IC306	F-4	VR306	B-1
IC307	C-4	VR307	D-2
IC309	G-2	VR308	D-3
IC310	G-1	VR309	B-3
IC311	E-2	VR310	A-5
IC312	F-2	VR311	C-3
		VR312	C-3
Q301	H-2	VR313	C-3
Q302	H-2	VR314	B-3
Q303	A-3	VR315	C-3
Q304	E-4	VR316	C-3
Q305	E-4	VR317	C-3
Q306	E-4	VR318	B-3
Q307	E-4	VR319	F-4
Q308	E-4	VR320	F-3
Q309	E-4	VR321	F-4
Q310	E-3	VR322	E-3
Q311	E-3	VR323	E-3
Q312	E-4	VR324	C-5
Q313	G-3	VR325	B-4
Q314	C-2	VR326	B-3
Q315	C-2	VR327	F-1
Q316	D-2	VR328	F-1
Q317	F-3	VR329	H-2
Q318	A-4	VR331	E-2
Q319	B-5	VR332	F-2
Q320	B-5		
Q322	F-5	D301	H-2
Q323	G-5	D302	H-2
Q324	G-5	D303	E-4
Q325	G-5	D304	G-3
Q327	F-3	D305	D-3
Q328	C-4	D306	E-3
Q329	B-4	D307	E-3
Q330	B-4	D308	B-1
Q331	G-3	D310	C-5
Q333	H-4	D311	C-5
Q334	H-4	D312	B-4
Q335	G-4	D313	B-4
Q336	G-4	D314	B-4
Q337	G-2	D317	D-1
Q338	E-2	D319	F-4
Q339	E-3	D320	G-1
Q340	F-2		
Q341	F-2		
Q342	G-2		
Q354	C-3		
Q355	D-3		
Q357	F-3		
Q358	F-3		
Q359	G-2		
Q360	G-2		
Q361	F-3		
Q362	G-3		
Q363	D-3		

PROCESS CIRCUIT BOARD (VEPW0188)

NOTES

1. ⊣⊢Ⓝ NON POLARITY CAPACIT
2. ⊣⊢Ⓣ TANTALUM CAPACITOR
3. ⊣⊢Ⓜ MYLAR CAPACITOR


5
4
3
2
1
A
B
C
D
E
F
G
H
DL301 EFDMA645C45E
DL303 EFDVN645B15B
VR305 500B
R.B. SEP.
BIAS VOLTAGE
3.58MHz
V-BALL.
RESIDUAL IMAGE
OB OFF SET
R-B COLOR GAIN
AGC
AUTO IRIS
NTSC PED.
COLOR PHASE
NEGA COLOR PHASE
CARRIER PHASE
CARRIER BALL.
CHROMA SATURATION CLIP
H.C.
R-Y GAIN
COLOR GAIN
AWC SET.
IC310 AN6914
P307
P310
P306
P308
P309
P301

P301

1	THERMISTOR
2	DRIVE
3	CONTROL
4	DRIVE
5	CONTROL
6	GND

P302

1	PREAMP OUT
2	GND

P303

1	5V
2	P.B
3	IRIS DELAY
4	6V
5	AWC 5V
6	CP1
7	CP2
8	VSS
9	9V

P305

1	GND
2	TITLE OUT
3	FADE
4	REC LED
5	CHARACTER
6	TITLE COLOR SW
7	TITLE IN
8	TITLE IN

P306

1	9V
2	FADE

P307

1	SENSITIVITY
2	LOW CLIP
3	5V
4	NEGA/POSI SW
5	GND
6	LOW CLIP

P308

1	AWC
2	REC LED

P309

1	(B)GAIN CONTROL
2	(R)GAIN CONTROL
3	5V
4	GND

P310

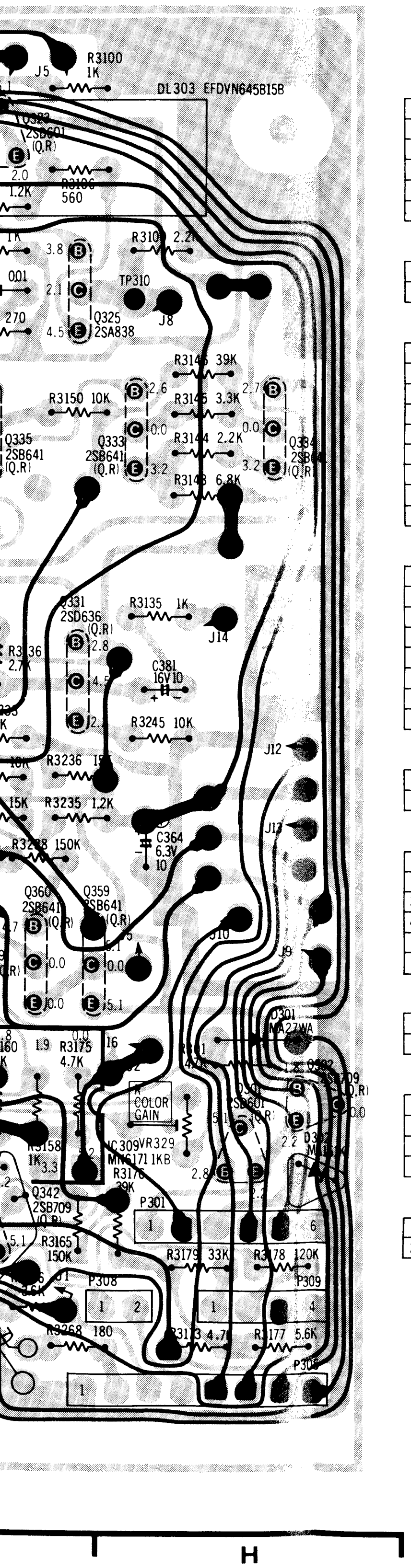
1	NTSC
2	GND

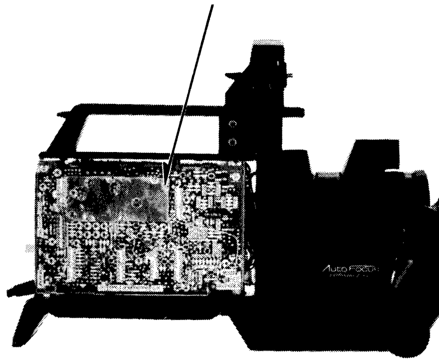
NOTES

1. Ⓝ NON POLARITY CAPACIT

2. Ⓣ TANTALUM CAPACITOR

3. Ⓜ MYLAR CAPACITOR


R3100
1K
J5
DL303 EFDVN645B15B
Q303
2SD601
(Q.R)
R3106
560
R3101
2.2K
TP310
J8
Q325
2SA838
R3150 10K
Q335
2SB641
(Q.R)
Q333
2SB641
(Q.R)
R3145 39K
R3146 3.3K
R3144 2.2K
R3143 6.8K
Q334
Q331
2SD636
(Q.R)
R3135 1K
J14
C381
16V10
R3245 10K
R3236
R3235 1.2K
R3238 150K
C364
6.3V
10
Q360
2SB641
Q359
2SB641
(Q.R)
J12
J11
J10
J9
R3175
4.7K
COLOR
GAIN
C309
VR329
MN6171 1KB
R3170
39K
Q342
2SB709
(Q.R)
R3165
150K
R3158
1K
Q301
MA27WA
Q302
2SB709
(Q.R)
P301
R3179 33K
R3178 120K
P308
P309
R3268 180
R3173 4.7K
R3177 5.6K
P306
H


Process Circuit Board

P301

1	THERMISTOR
2	DRIVE
3	CONTROL
4	DRIVE
5	CONTROL
6	GND

P302

1	PREAMP OUT
2	GND

P303

1	5V
2	P.B
3	IRIS DELAY
4	6V
5	AWC 5V
6	CP1
7	CP2
8	VSS
9	9V

P305

1	GND
2	TITLE OUT
3	FADE
4	REC LED
5	CHARACTER
6	TITLE COLOR SW
7	TITLE IN
8	TITLE IN

P306

1	9V
2	FADE

P307

1	SENSITIVITY
2	LOW CLIP
3	5V
4	NEGA/POSI SW
5	GND
6	LOW CLIP

P308

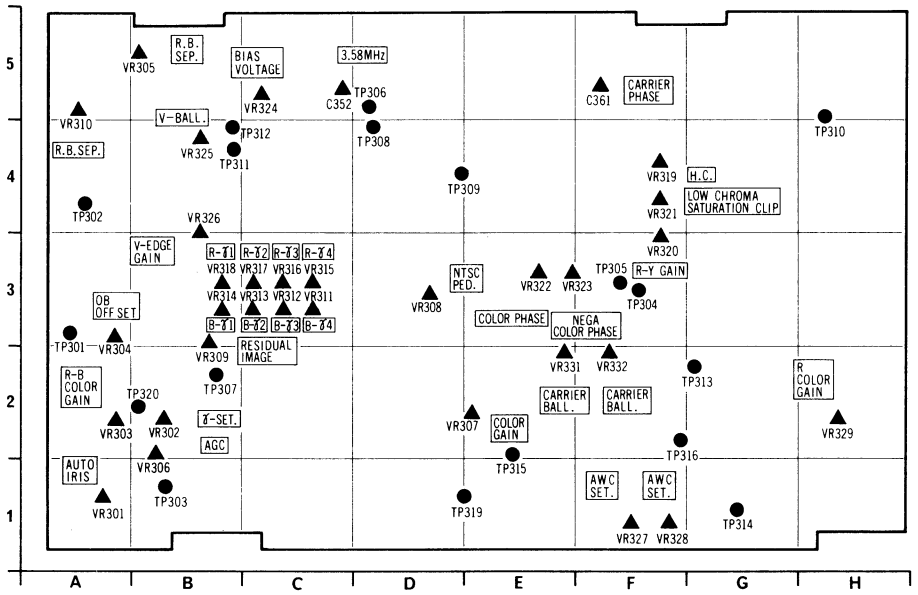
1	AWC
2	REC LED

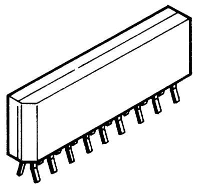
P309

1	(B)GAIN CONTROL
2	(R)GAIN CONTROL
3	5V
4	GND

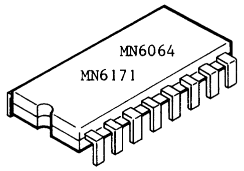
P310

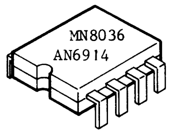
1	NTSC
2	GND

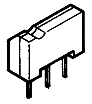

5
4
3
2
1
A
B
C
D
E
F
G
H
VR305
R.B.
SEP.
BIAS
VOLTAGE
3.58MHz
VR324
C352
TP306
TP308
C361
CARRIER
PHASE
VR310
V-BALL.
TP312
VR325
TP311
R.B.SEP.
TP310
TP309
VR319
H.C.
VR321
LOW CHROMA
SATURATION CLIP
TP302
VR326
VR320
V-EDGE
GAIN
R-γ1
R-γ2
R-γ3
R-γ4
VR318
VR317
VR316
VR315
VR314
VR313
VR312
VR311
B-γ1
B-γ2
B-γ3
B-γ4
OB
OFF SET
NTSC
PED.
VR308
VR322
VR323
TP305
R-Y GAIN
TP304
COLOR PHASE
NEGA
COLOR PHASE
TP301
VR304
VR309
RESIDUAL
IMAGE
VR331
VR332
TP313
R-B
COLOR
GAIN
TP320
TP307
R
COLOR
GAIN
VR303
VR302
γ-SET.
CARRIER
BALL.
CARRIER
BALL.
VR329
VR307
COLOR
GAIN
AGC
VR306
TP315
TP316
AUTO
IRIS
VR301
TP303
TP319
AWC
SET.
AWC
SET.
TP314
VR327
VR328



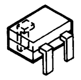
AN2133
AN2141
AN2241
AN2331
AN2431
AN2340
AN2341


MN6064
MN6171

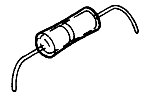

MN8036
AN6914



2SB788	2SD669A
2SD636(Q,R)	2SB793A
2SB641(Q,R)	2SD973A
2SC1565A	2SD601(Q,R)
2SA1018(Q,R)	2SC1684(Q,R)
2SB709(Q,R)	2SC2206
2SD662(Q,R)	2SC2377
2SD662(R)	2SA838

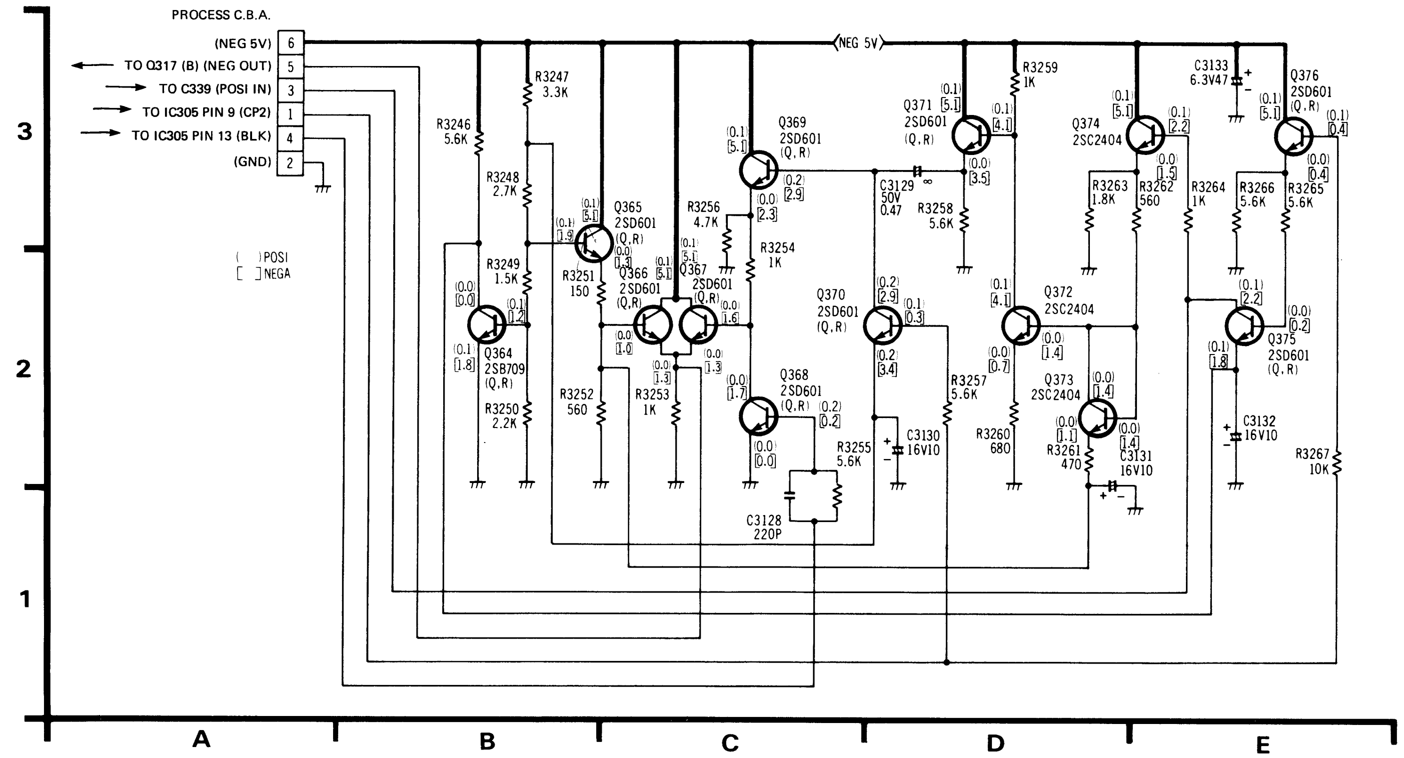


2SD601(Q,R)
2SB709(Q,R)
2SA838
2SD636(Q,R)
2SB641(Q,R)

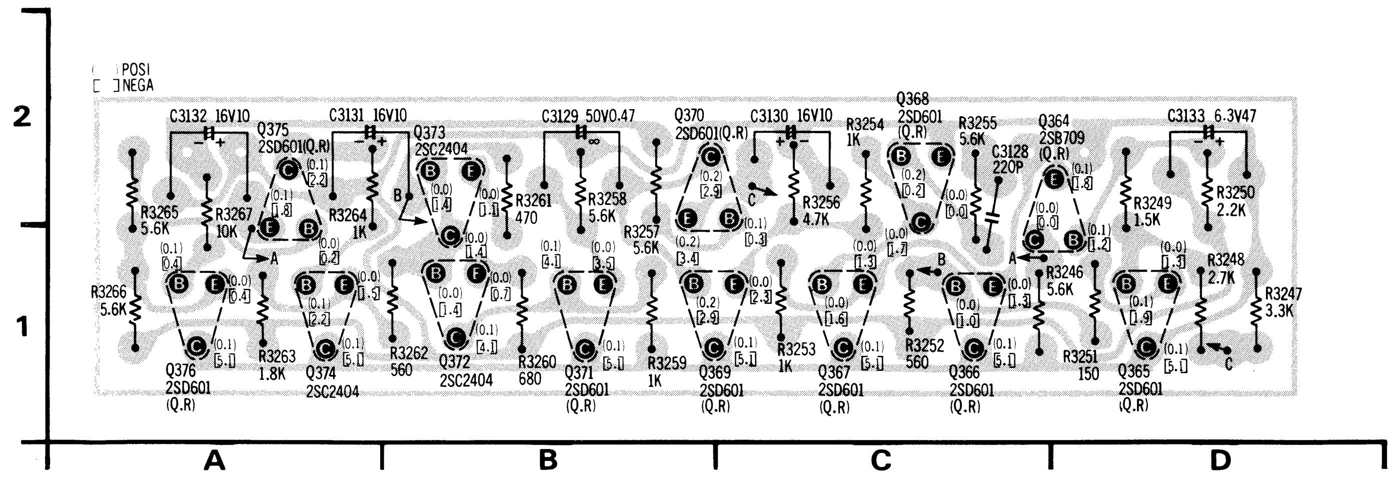


MA165
MA27WA
MA151K
MA27A
MZ303A
OA90A-R

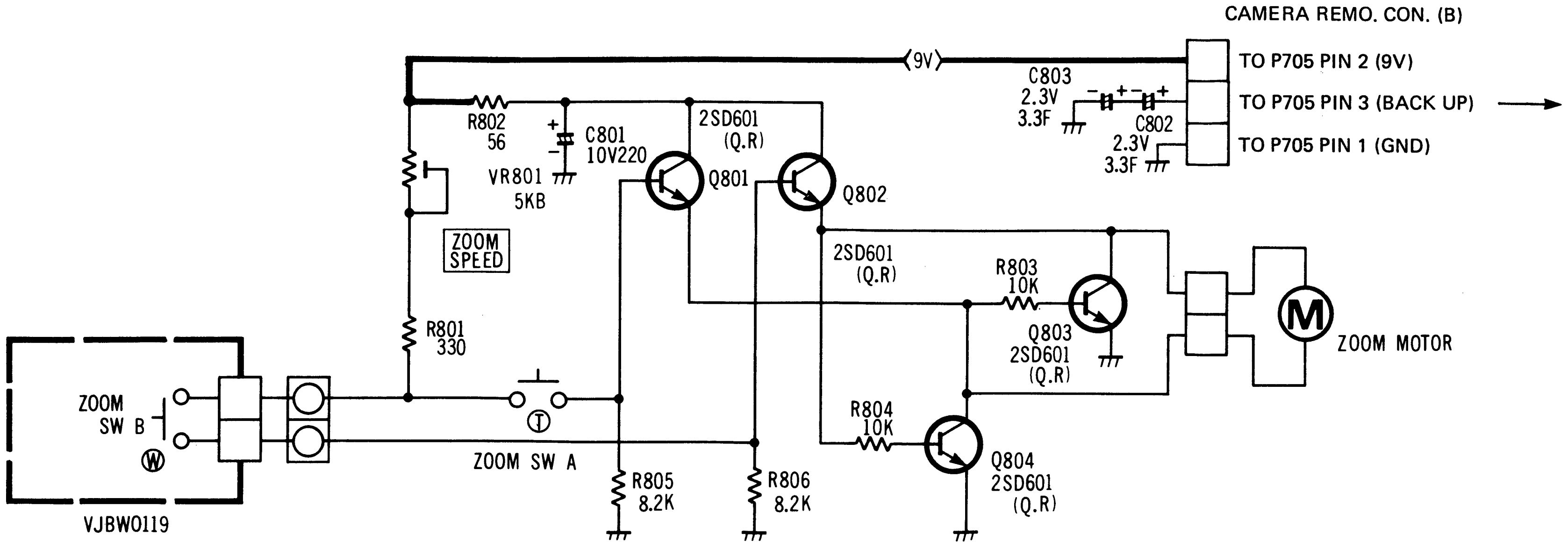
NEGA/POSI SCHEMATIC DIAGRAM


PROCESS C.B.A.
(NEG 5V) 6
TO Q317 (B) (NEG OUT) 5
TO C339 (POSI IN) 3
TO IC305 PIN 9 (CP2) 1
TO IC305 PIN 13 (BLK) 4
(GND) 2
(NEG 5V)
( ) POSI
[ ] NEGA
R3246
5.6K
R3247
3.3K
R3248
2.7K
R3249
1.5K
R3250
2.2K
Q364
2SB709
(Q.R)
Q365
2SD601
(Q.R)
R3251
150
R3252
560
R3253
1K
Q366
2SD601
(Q.R)
Q367
2SD601
(Q.R)
R3256
4.7K
R3254
1K
Q369
2SD601
(Q.R)
Q368
2SD601
(Q.R)
C3128
220P
R3255
5.6K
Q370
2SD601
(Q.R)
C3129
50V
0.47
C3130
16V10
R3258
5.6K
R3257
5.6K
Q371
2SD601
(Q.R)
R3259
1K
R3260
680
R3261
470
Q372
2SC2404
Q373
2SC2404
C3131
16V10
Q374
2SC2404
R3263
1.8K
R3262
560
R3264
1K
C3133
6.3V47
Q376
2SD601
(Q.R)
R3266
5.6K
R3265
5.6K
Q375
2SD601
(Q.R)
C3132
16V10
R3267
10K
3
2
1
A
B
C
D
E

NEGA/POSI CIRCUIT BOARD (VEPW0211)

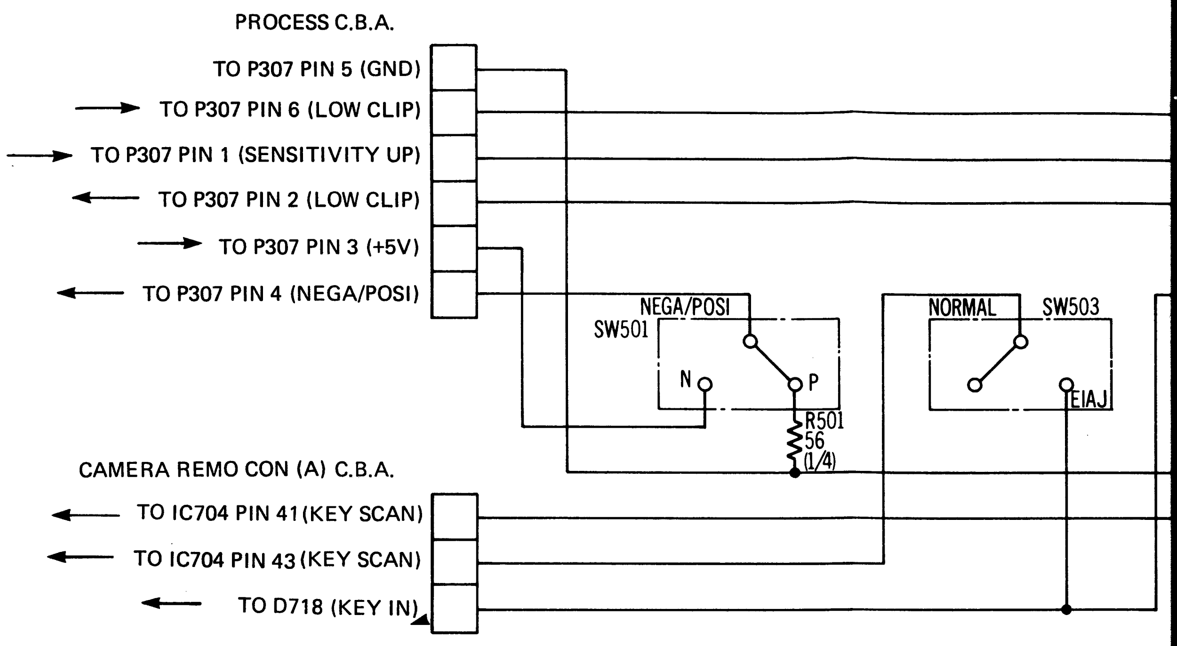

( ) POSI
[ ] NEGA
2
1
A
B
C
D
C3132 16V10
Q375
2SD601(Q.R)
C3131 16V10
Q373
2SC2404
C3129 50V0.47
Q370
2SD601(Q.R)
C3130 16V10
R3254
1K
Q368
2SD601
(Q.R)
R3255
5.6K
C3128
220P
Q364
2SB709
(Q.R)
C3133 6.3V47
R3265
5.6K
R3267
10K
R3264
1K
R3261
470
R3258
5.6K
R3257
5.6K
R3256
4.7K
R3249
1.5K
R3250
2.2K
R3246
5.6K
R3248
2.7K
R3247
3.3K
R3266
5.6K
R3263
1.8K
R3262
560
R3260
680
R3259
1K
R3253
1K
R3252
560
R3251
150
Q376
2SD601
(Q.R)
Q374
2SC2404
Q372
2SC2404
Q371
2SD601
(Q.R)
Q369
2SD601
(Q.R)
Q367
2SD601
(Q.R)
Q366
2SD601
(Q.R)
Q365
2SD601
(Q.R)

POWER ZOOM SCHEMATIC DIAGRAM



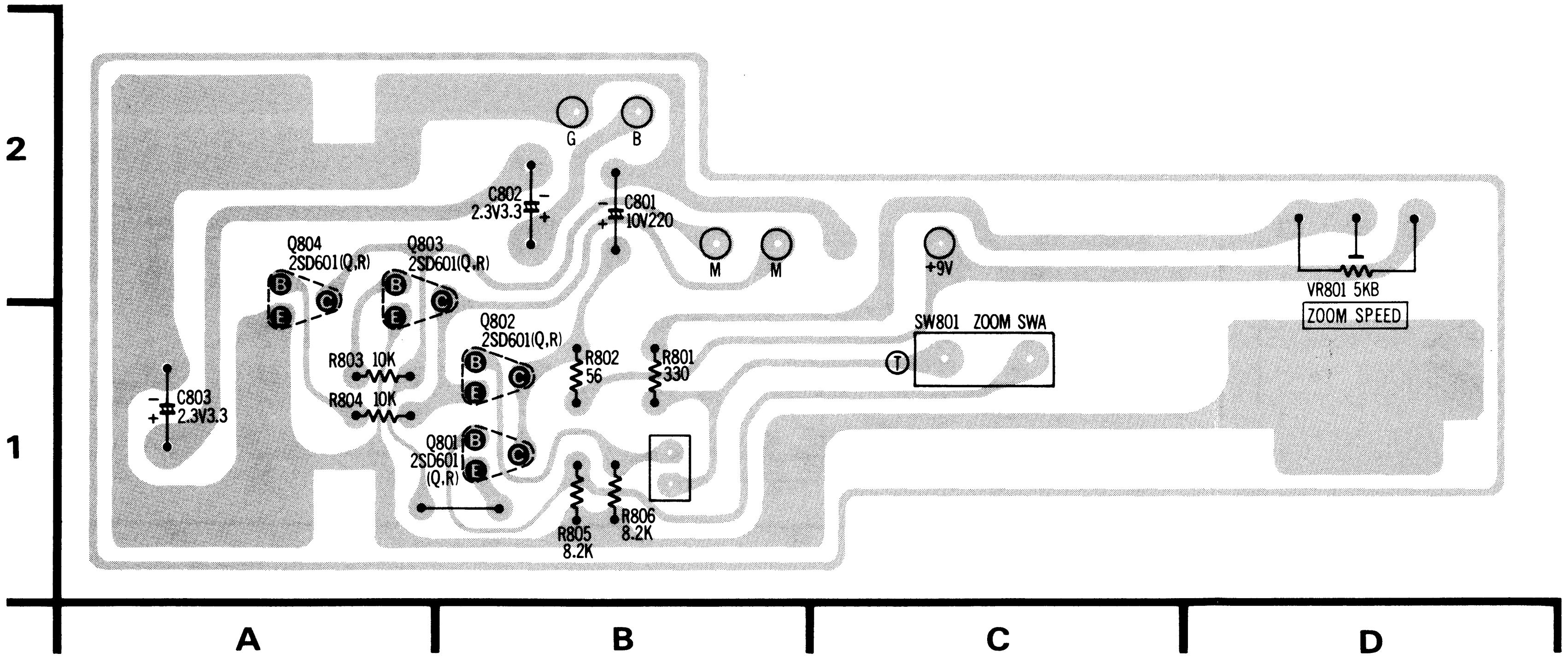
CAMERA REMO. CON. (B)
TO P705 PIN 2 (9V)
TO P705 PIN 3 (BACK UP)
TO P705 PIN 1 (GND)
9V
C803
2.3V
3.3F
C802
2.3V
3.3F
R802
56
C801
10V220
VR801
5KB
ZOOM SPEED
2SD601
(Q.R)
Q801
Q802
2SD601
(Q.R)
R803
10K
Q803
2SD601
(Q.R)
ZOOM MOTOR
M
R801
330
ZOOM SW B
W
T
ZOOM SW A
R805
8.2K
R806
8.2K
R804
10K
Q804
2SD601
(Q.R)
VJBW0119

REAR SIDE SCHEMATIC DIAGRAM



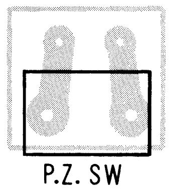
PROCESS C.B.A.
TO P307 PIN 5 (GND)
TO P307 PIN 6 (LOW CLIP)
TO P307 PIN 1 (SENSITIVITY UP)
TO P307 PIN 2 (LOW CLIP)
TO P307 PIN 3 (+5V)
TO P307 PIN 4 (NEGA/POSI)
NEGA/POSI
SW501
N
P
R501
56
(1/4)
NORMAL
SW503
EIAJ
CAMERA REMO CON (A) C.B.A.
TO IC704 PIN 41 (KEY SCAN)
TO IC704 PIN 43 (KEY SCAN)
TO D718 (KEY IN)

POWER ZOOM (A) CIRCUIT BOARD (VEPW0199)

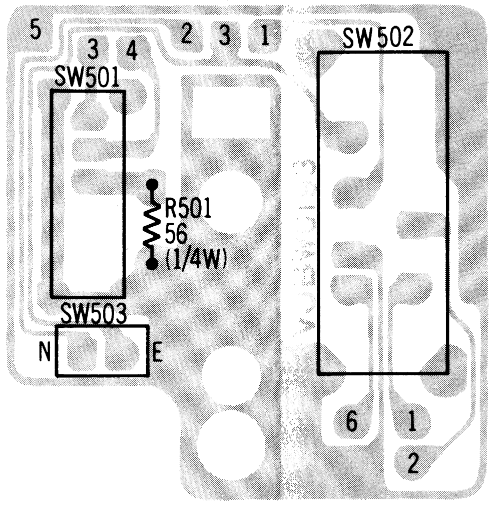


2
1
A
B
C
D
G
B
C802
2.3V3.3
C801
10V220
M
M
+9V
VR801 5KB
ZOOM SPEED
Q804
2SD601(Q.R)
Q803
2SD601(Q.R)
Q802
2SD601(Q.R)
R803 10K
R804 10K
R802
56
R801
330
SW801 ZOOM SWA
T
C803
2.3V3.3
Q801
2SD601
(Q.R)
R805
8.2K
R806
8.2K

POWER ZOOM (B) CIRCUIT BOARD (VEPW0119)

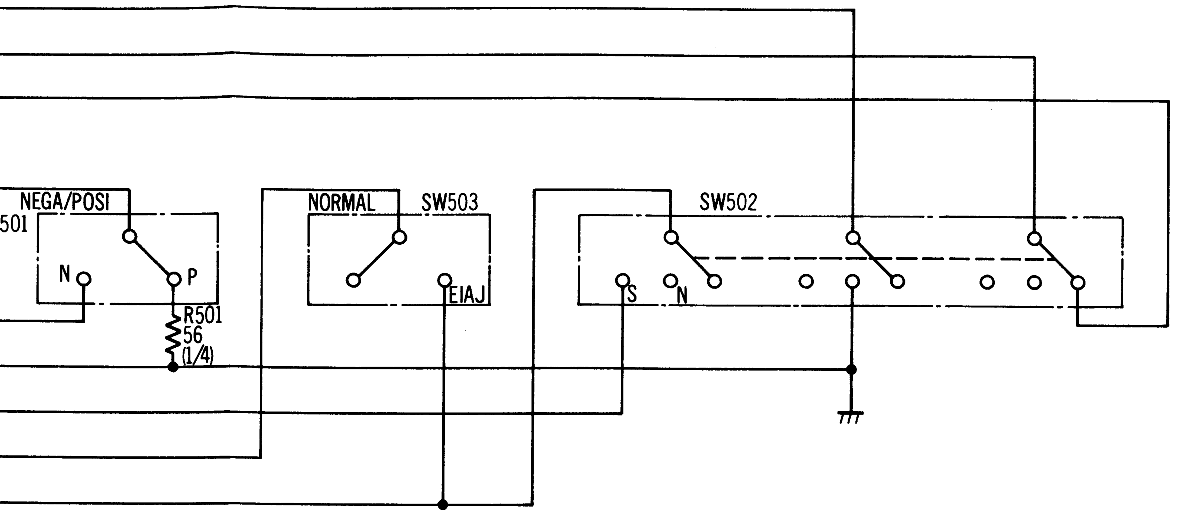


REAR SIDE CIRCUIT BOARD (VEPW0193)

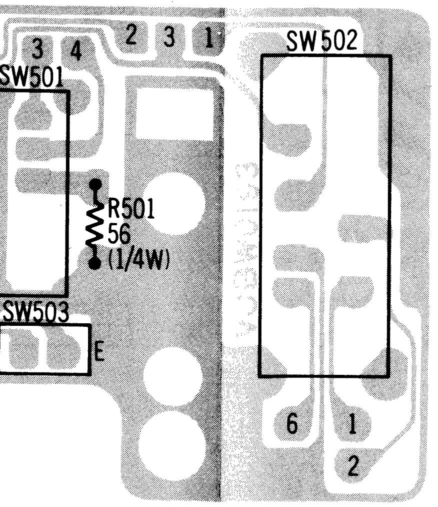


5
3
4
2
3
1
SW501
SW502
R501
56
(1/4W)
SW503
N
E
6
1
2

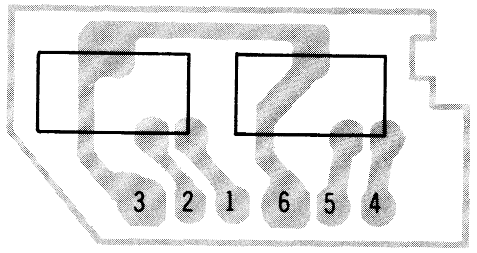
DIAGRAM


NEGA/POSI
501
N
P
R501
56
(1/4)
NORMAL
SW503
EIAJ
SW502
S
N

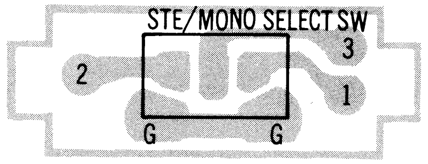
SIDE CIRCUIT BOARD
(VEPW0193)


3 4
2 3 1
SW501
SW502
R501
56
(1/4W)
SW503
E
6
1
2

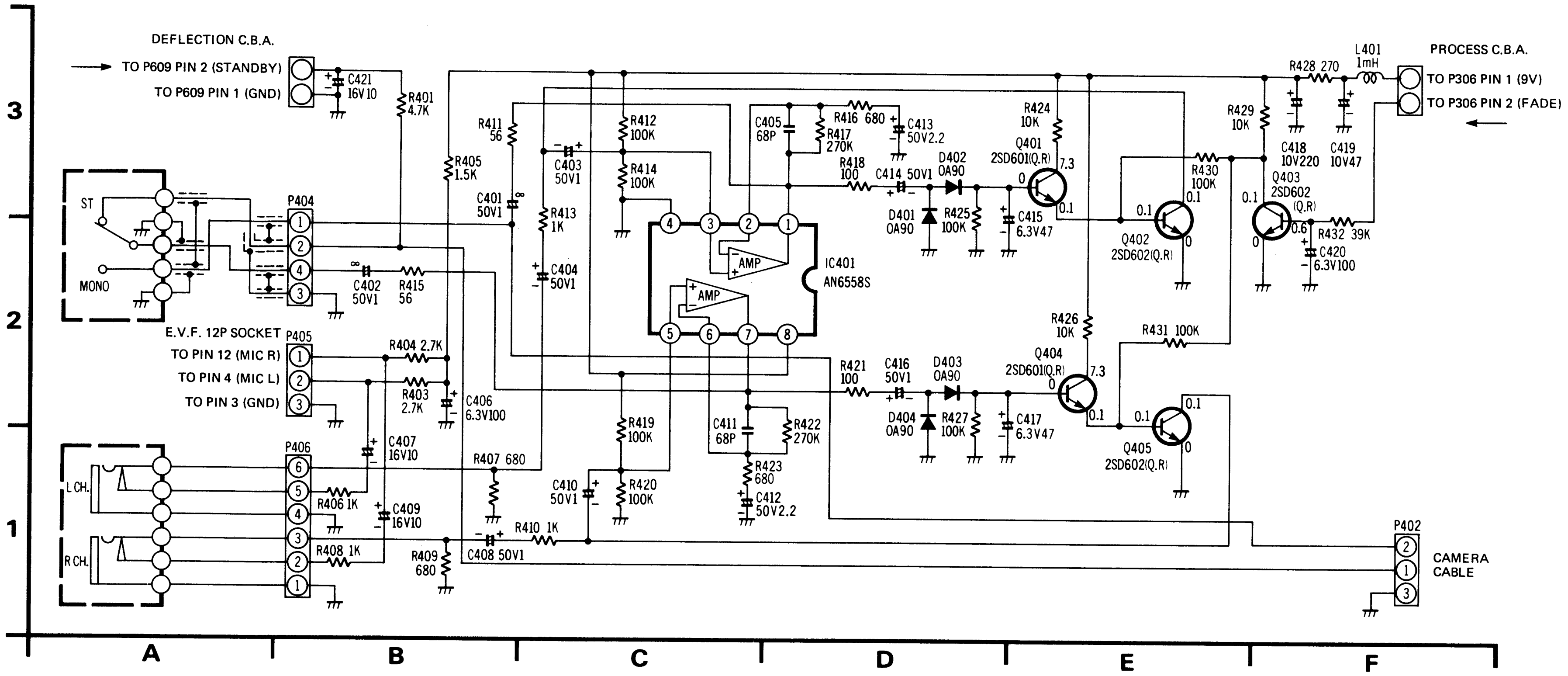
STEREO JACK CIRCUIT BOARD
(VEPW0191)



STEREO/MONO SELECT SW CIRCUIT BOARD (VEPW0192)


STE/MONO SELECT SW
2
3
1
G
G

STEREO SCHEMATIC DIAGRAM


DEFLECTION C.B.A.
TO P609 PIN 2 (STANDBY)
TO P609 PIN 1 (GND)
C421 16V10
R401 4.7K
ST
MONO
P404
R411 56
R405 1.5K
C401 50V1
C403 50V1
R413 1K
C404 50V1
C402 50V1
R415 56
R412 100K
R414 100K
C405 68P
R417 270K
R416 680
C413 50V2.2
R418 100
C414 50V1
D402 OA90
D401 OA90
R425 100K
C415 6.3V47
AMP
AMP
IC401
AN6558S
R424 10K
Q401
2SD601(Q.R)
7.3
0
0.1
R430 100K
Q402
2SD602(Q.R)
0.1
0
R429 10K
R428 270
L401 1mH
C418 10V220
C419 10V47
Q403
2SD602
(Q.R)
0.6
R432 39K
C420 6.3V100
PROCESS C.B.A.
TO P306 PIN 1 (9V)
TO P306 PIN 2 (FADE)
E.V.F. 12P SOCKET
P405
TO PIN 12 (MIC R)
TO PIN 4 (MIC L)
TO PIN 3 (GND)
R404 2.7K
R403 2.7K
C406 6.3V100
C407 16V10
P406
L CH.
R CH.
R406 1K
C409 16V10
R408 1K
R407 680
R409 680
C408 50V1
R410 1K
C410 50V1
R419 100K
R420 100K
C411 68P
R422 270K
R423 680
C412 50V2.2
R421 100
C416 50V1
D403 OA90
D404 OA90
R427 100K
C417 6.3V47
R426 10K
Q404
2SD601(Q.R)
R431 100K
Q405
2SD602(Q.R)
P402
CAMERA CABLE
3
2
1
A
B
C
D
E
F

STEREO CIRCUIT BOARD (VEPW0190)

P402

1	AUDIO(R)
2	AUDIO(L)
3	GND

P404

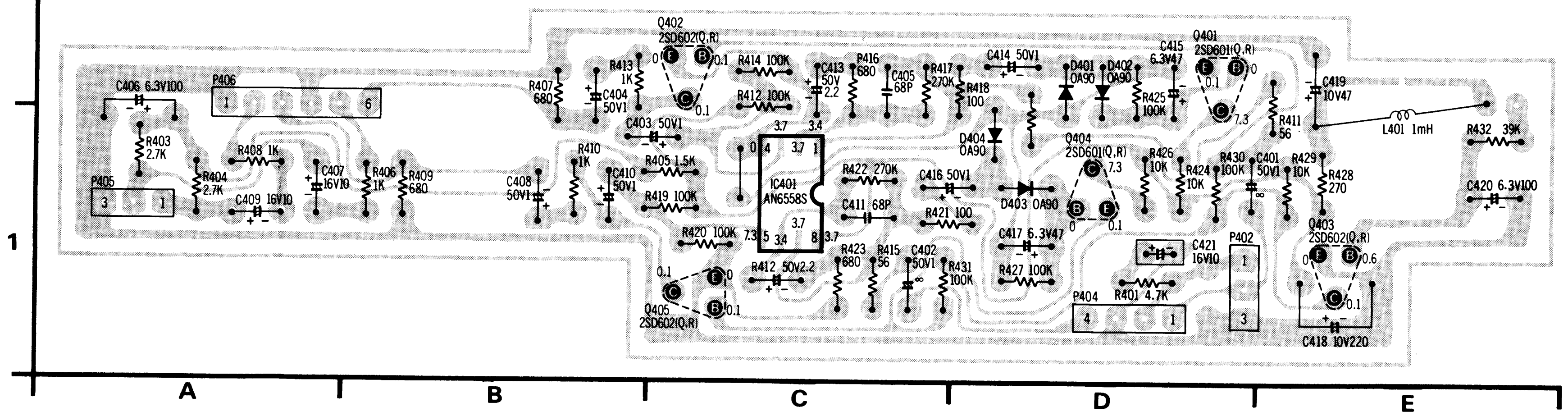
1	STEREO
2	STEREO
3	GND
4	MONO

P405

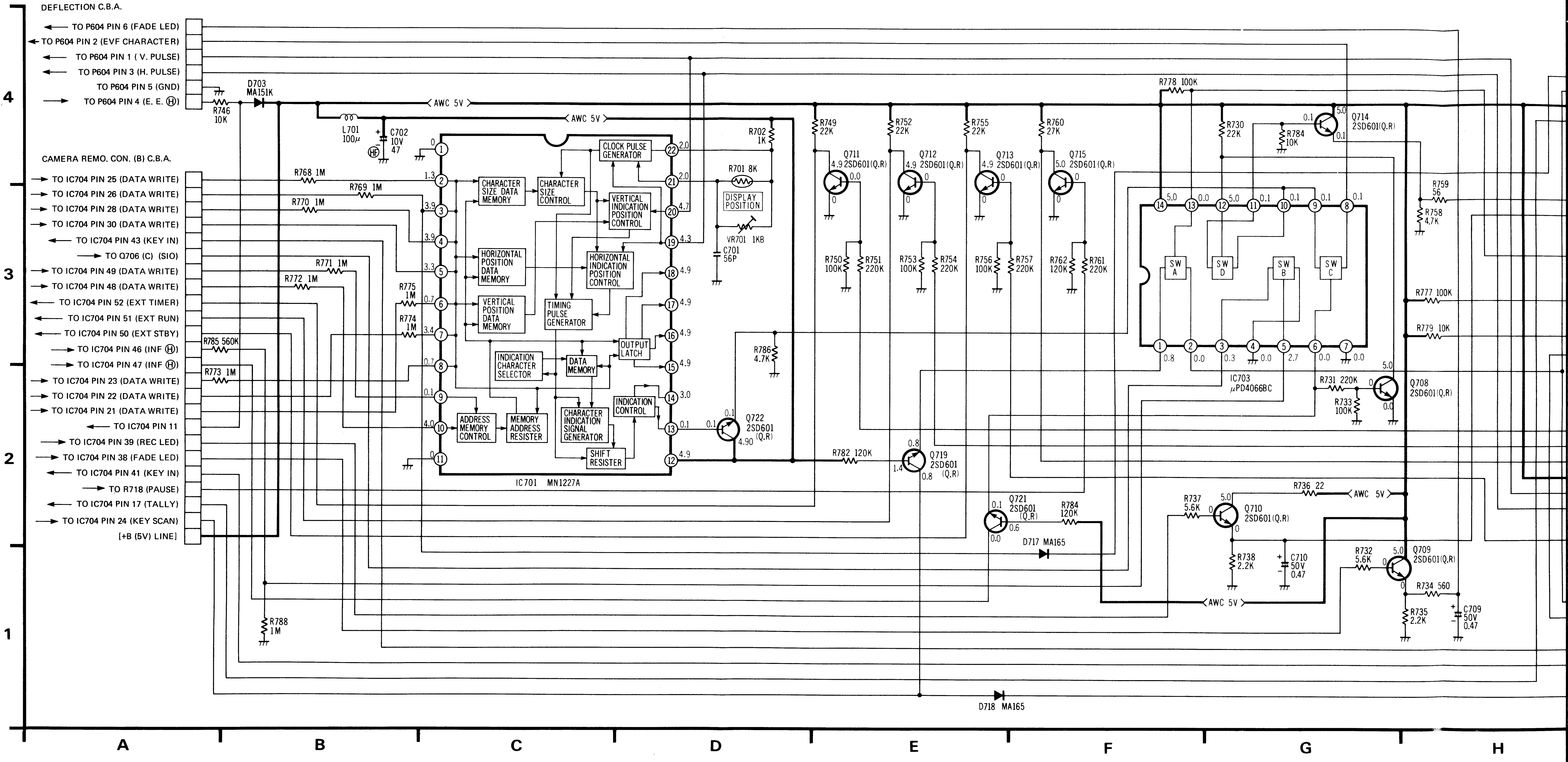
1	MIC(R)
2	MIC(L)
3	GND

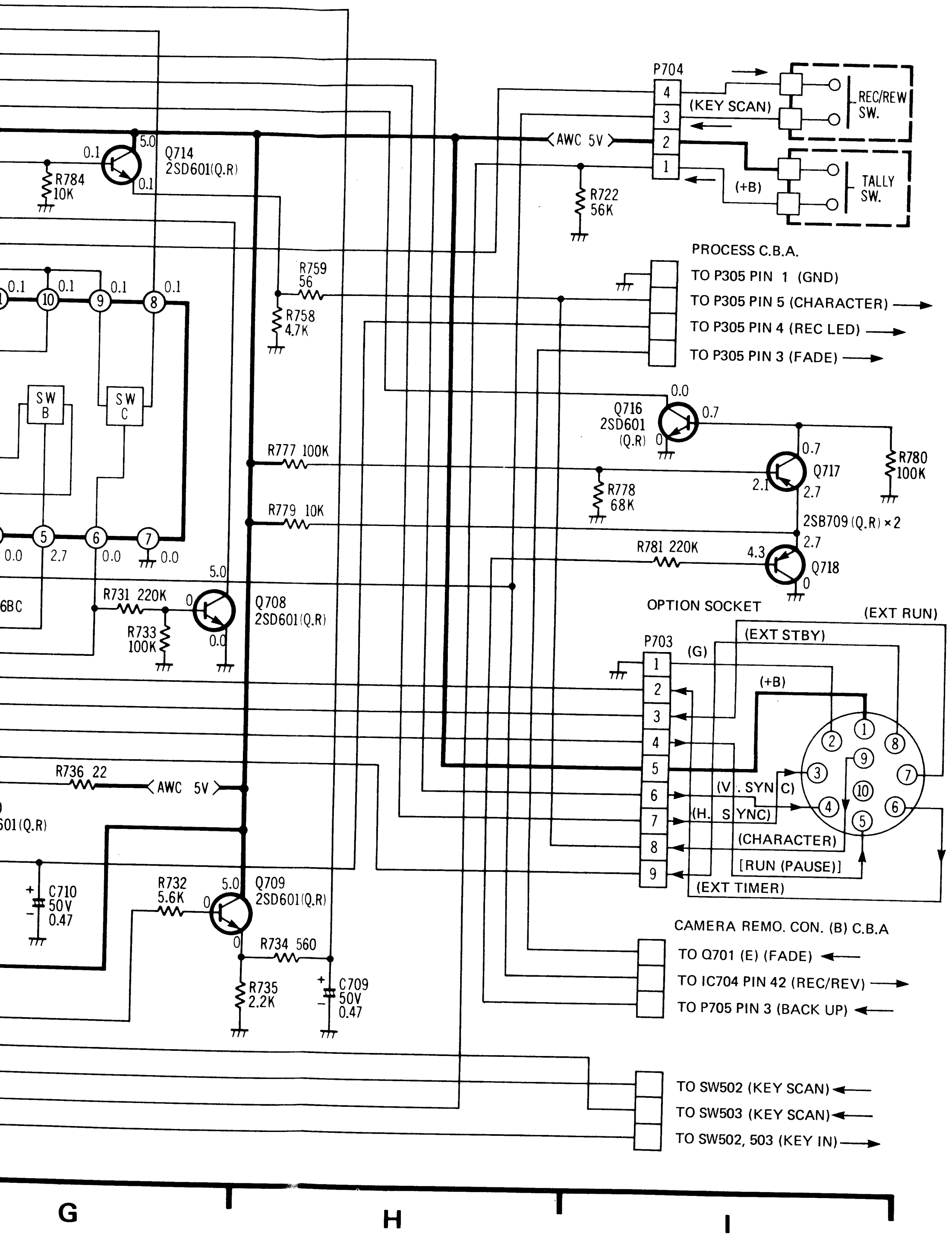
P406

1	GND
2	AUDIO IN(R)
3	AUDIO OUT(R)
4	GND
5	AUDIO IN(L)
6	AUDIO OUT(L)

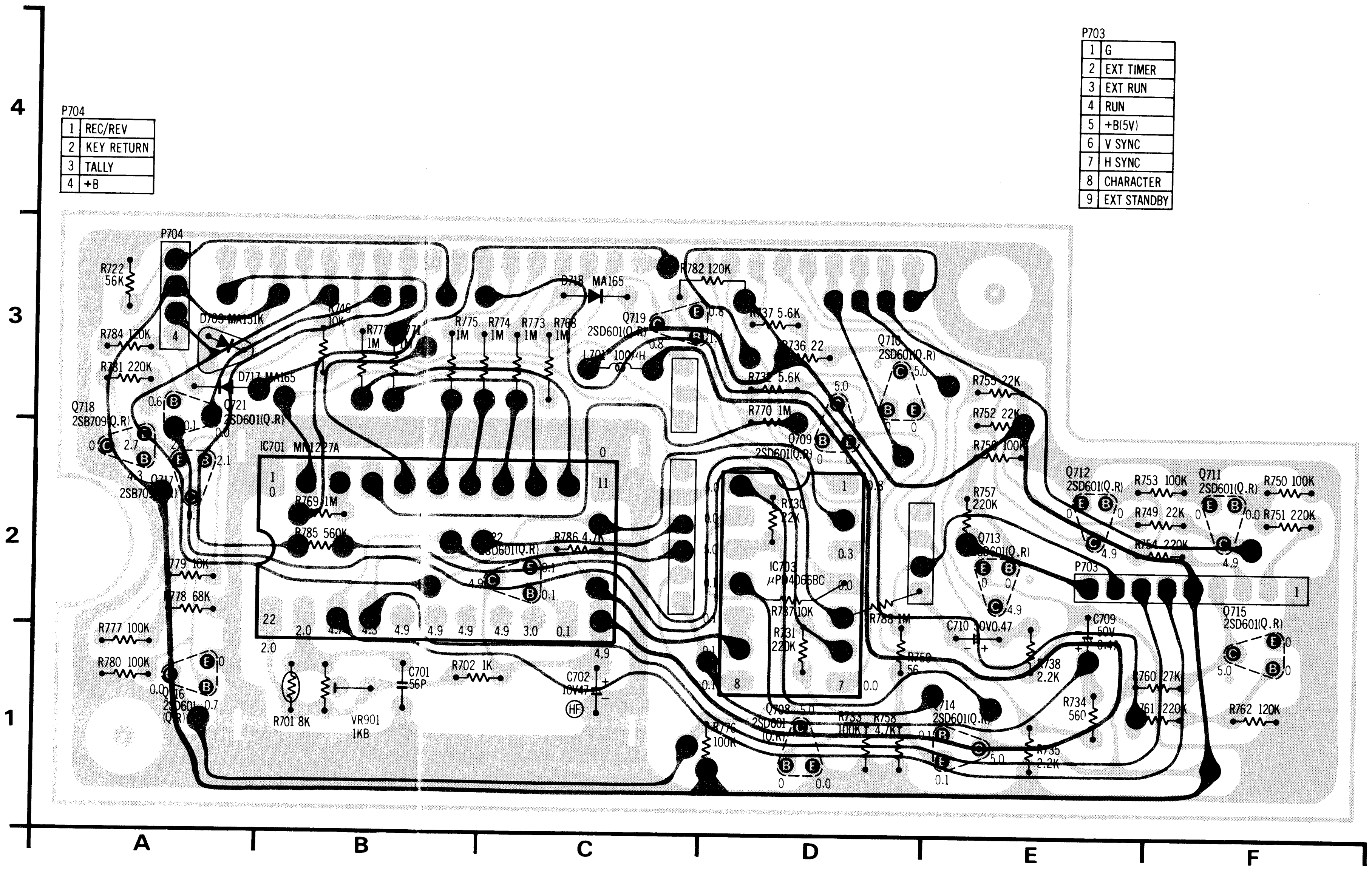

2
1
C406 6.3V100
P406
1
6
R403 2.7K
R404 2.7K
P405
3
1
R408 1K
C409 16V10
C407 16V10
R406 1K
R409 680
R407 680
R413 1K
C404 50V1
Q402
2SD602(Q.R)
R414 100K
R412 100K
C413 50V 2.2
P416 680
C405 68P
R417 270K
R418 100
C414 50V1
D401 OA90
D402 OA90
C415 6.3V47
R425 100K
Q401
2SD601(Q.R)
C419 10V47
R411 56
L401 1mH
R432 39K
C403 50V1
C408 50V1
R410 1K
C410 50V1
R405 1.5K
R419 100K
IC401
AN6558S
R422 270K
C411 68P
C416 50V1
R421 100
D404 OA90
D403 OA90
Q404
2SD601(Q.R)
R426 10K
R424 10K
R430 100K
C401 50V1
R429 10K
R428 270
C420 6.3V100
R420 100K
R423 680
R415 56
C402 50V1
R431 100K
C417 6.3V47
R427 100K
C421 16V10
P402
R412 50V2.2
Q405
2SD602(Q.R)
P404
4
1
R401 4.7K
Q403
2SD602(Q.R)
C418 10V220
A
B
C
D
E

CAMERA REMOTE CONTROL (A) SCHEMATIC DIAGRAM

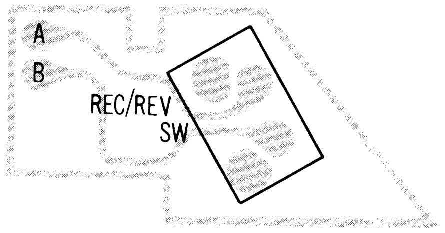

DEFLECTION C.B.A.
TO P604 PIN 6 (FADE LED)
TO P604 PIN 2 (EVF CHARACTER)
TO P604 PIN 1 (V. PULSE)
TO P604 PIN 3 (H. PULSE)
TO P604 PIN 5 (GND)
TO P604 PIN 4 (E. E. Ⓗ)
CAMERA REMO. CON. (B) C.B.A.
TO IC704 PIN 25 (DATA WRITE)
TO IC704 PIN 26 (DATA WRITE)
TO IC704 PIN 28 (DATA WRITE)
TO IC704 PIN 30 (DATA WRITE)
TO IC704 PIN 43 (KEY IN)
TO Q706 (C) (SIO)
TO IC704 PIN 49 (DATA WRITE)
TO IC704 PIN 48 (DATA WRITE)
TO IC704 PIN 52 (EXT TIMER)
TO IC704 PIN 51 (EXT RUN)
TO IC704 PIN 50 (EXT STBY)
TO IC704 PIN 46 (INF Ⓗ)
TO IC704 PIN 47 (INF Ⓗ)
TO IC704 PIN 23 (DATA WRITE)
TO IC704 PIN 22 (DATA WRITE)
TO IC704 PIN 21 (DATA WRITE)
TO IC704 PIN 11
TO IC704 PIN 39 (REC LED)
TO IC704 PIN 38 (FADE LED)
TO IC704 PIN 41 (KEY IN)
TO R718 (PAUSE)
TO IC704 PIN 17 (TALLY)
TO IC704 PIN 24 (KEY SCAN)
[+B (5V) LINE]
D703 MA151K
R746 10K
AWC 5V
L701 100μ
C702 10V 47
Ⓗ
R768 1M
R769 1M
R770 1M
R771 1M
R772 1M
R775 1M
R774 1M
R785 560K
R773 1M
R788 1M
CLOCK PULSE GENERATOR
CHARACTER SIZE DATA MEMORY
CHARACTER SIZE CONTROL
VERTICAL INDICATION POSITION CONTROL
HORIZONTAL POSITION DATA MEMORY
HORIZONTAL INDICATION POSITION CONTROL
VERTICAL POSITION DATA MEMORY
TIMING PULSE GENERATOR
OUTPUT LATCH
INDICATION CHARACTER SELECTOR
DATA MEMORY
INDICATION CONTROL
ADDRESS MEMORY CONTROL
MEMORY ADDRESS RESISTER
CHARACTER INDICATION SIGNAL GENERATOR
SHIFT RESISTER
IC701 MN1227A
R702 1K
R701 8K
DISPLAY POSITION
VR701 1KB
C701 56P
R786 4.7K
Q722 2SD601 (Q.R)
R782 120K
Q719 2SD601 (Q.R)
R749 22K
R752 22K
R755 22K
R760 27K
Q711 2SD601(Q.R)
Q712 2SD601(Q.R)
Q713 2SD601(Q.R)
Q715 2SD601(Q.R)
R750 100K
R751 220K
R753 100K
R754 220K
R756 100K
R757 220K
R762 120K
R761 220K
Q721 2SD601 (Q.R)
R784 120K
D717 MA165
D718 MA165
R778 100K
R730 22K
R784 10K
Q714 2SD601(Q.R)
SW A
SW D
SW B
SW C
IC703 μPD4066BC
R759 56
R758 4.7K
R777 100K
R779 10K
R731 220K
R733 100K
Q708 2SD601(Q.R)
R736 22
R737 5.6K
Q710 2SD601(Q.R)
R738 2.2K
C710 50V 0.47
R732 5.6K
Q709 2SD601(Q.R)
R734 560
R735 2.2K
C709 50V 0.47
1
2
3
4
A
B
C
D
E
F
G
H


P704
(KEY SCAN)
REC/REW SW.
AWC 5V
(+B)
TALLY SW.
R722 56K
Q714 2SD601(Q.R)
R784 10K
R759 56
R758 4.7K
PROCESS C.B.A.
TO P305 PIN 1 (GND)
TO P305 PIN 5 (CHARACTER)
TO P305 PIN 4 (REC LED)
TO P305 PIN 3 (FADE)
SW B
SW C
Q716 2SD601 (Q.R)
R780 100K
Q717
2SB709 (Q.R) ×2
Q718
R777 100K
R779 10K
R778 68K
R781 220K
R731 220K
R733 100K
Q708 2SD601(Q.R)
OPTION SOCKET
P703
(EXT RUN)
(EXT STBY)
(G)
(+B)
(V. SYNC)
(H. SYNC)
(CHARACTER)
[RUN (PAUSE)]
(EXT TIMER)
R736 22
AWC 5V
C710 50V 0.47
R732 5.6K
Q709 2SD601(Q.R)
R734 560
R735 2.2K
C709 50V 0.47
CAMERA REMO. CON. (B) C.B.A
TO Q701 (E) (FADE)
TO IC704 PIN 42 (REC/REV)
TO P705 PIN 3 (BACK UP)
TO SW502 (KEY SCAN)
TO SW503 (KEY SCAN)
TO SW502, 503 (KEY IN)
G
H
I

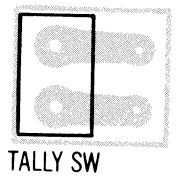
CAMERA REMOTE CONTROL (A) CIRCUIT BOARD (VEPW0196)


P704
1 REC/REV
2 KEY RETURN
3 TALLY
4 +B
P703
1 G
2 EXT TIMER
3 EXT RUN
4 RUN
5 +B(5V)
6 V SYNC
7 H SYNC
8 CHARACTER
9 EXT STANDBY
IC701 MN1227A
IC703 μPD4066BC
D718 MA165
D717 MA165
Q718 2SB709(Q.R)
Q719 2SD601(Q.R)
Q710 2SD601(Q.R)
Q712 2SD601(Q.R)
Q711 2SD601(Q.R)
Q713 2SD601(Q.R)
Q715 2SD601(Q.R)
Q714 2SD601(Q.R)
Q708 2SD601(Q.R)
Q716 2SD601(Q.R)
L701 100μH
C702 10V47
C701 56P
R701 8K
VR901 1KB
C709 50V 0.47
C710 50V 0.47
4
3
2
1
A
B
C
D
E
F

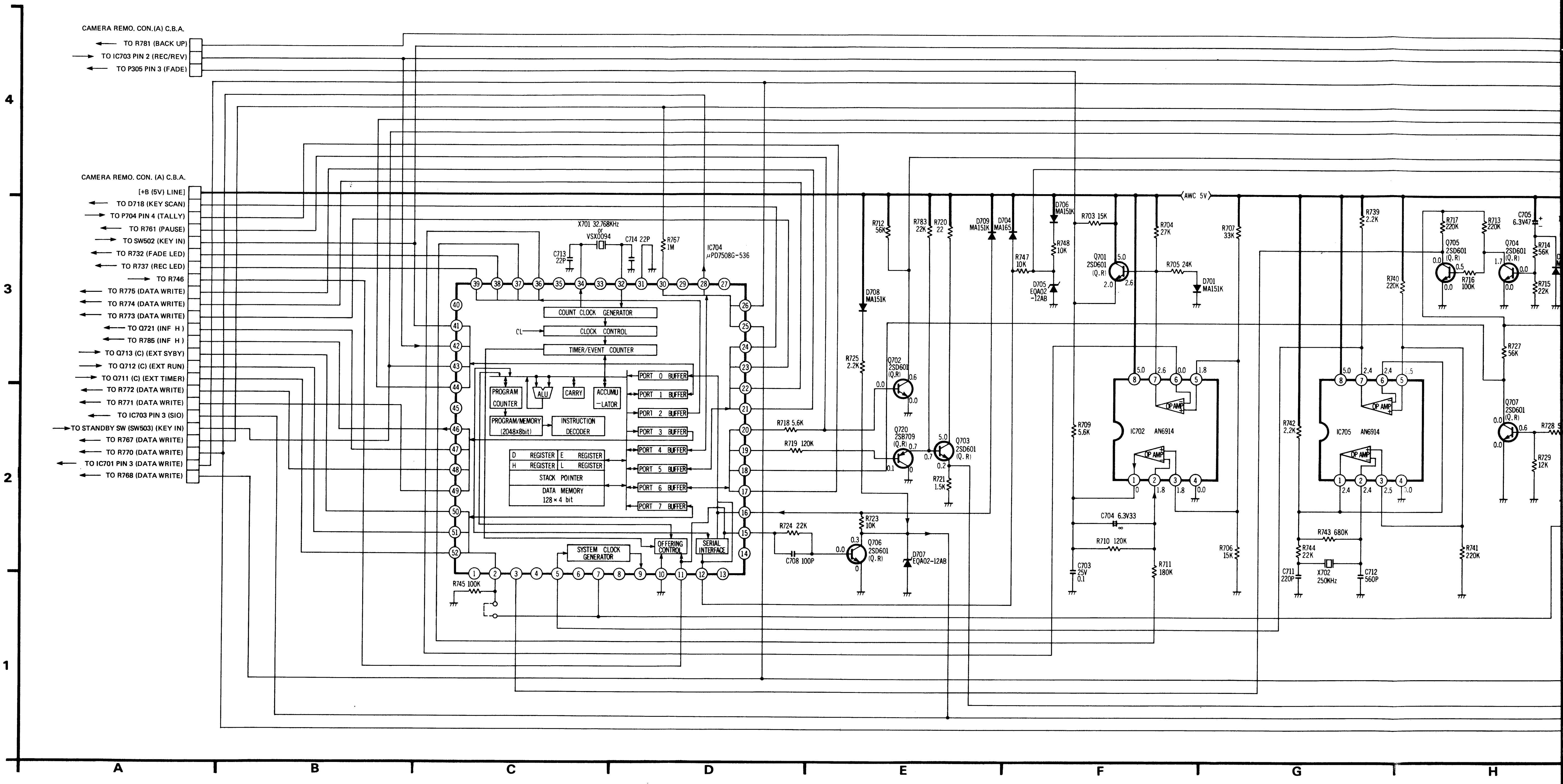
REC/REV CIRCUIT BOARD (VEPW0212)


A
B
REC/REV SW

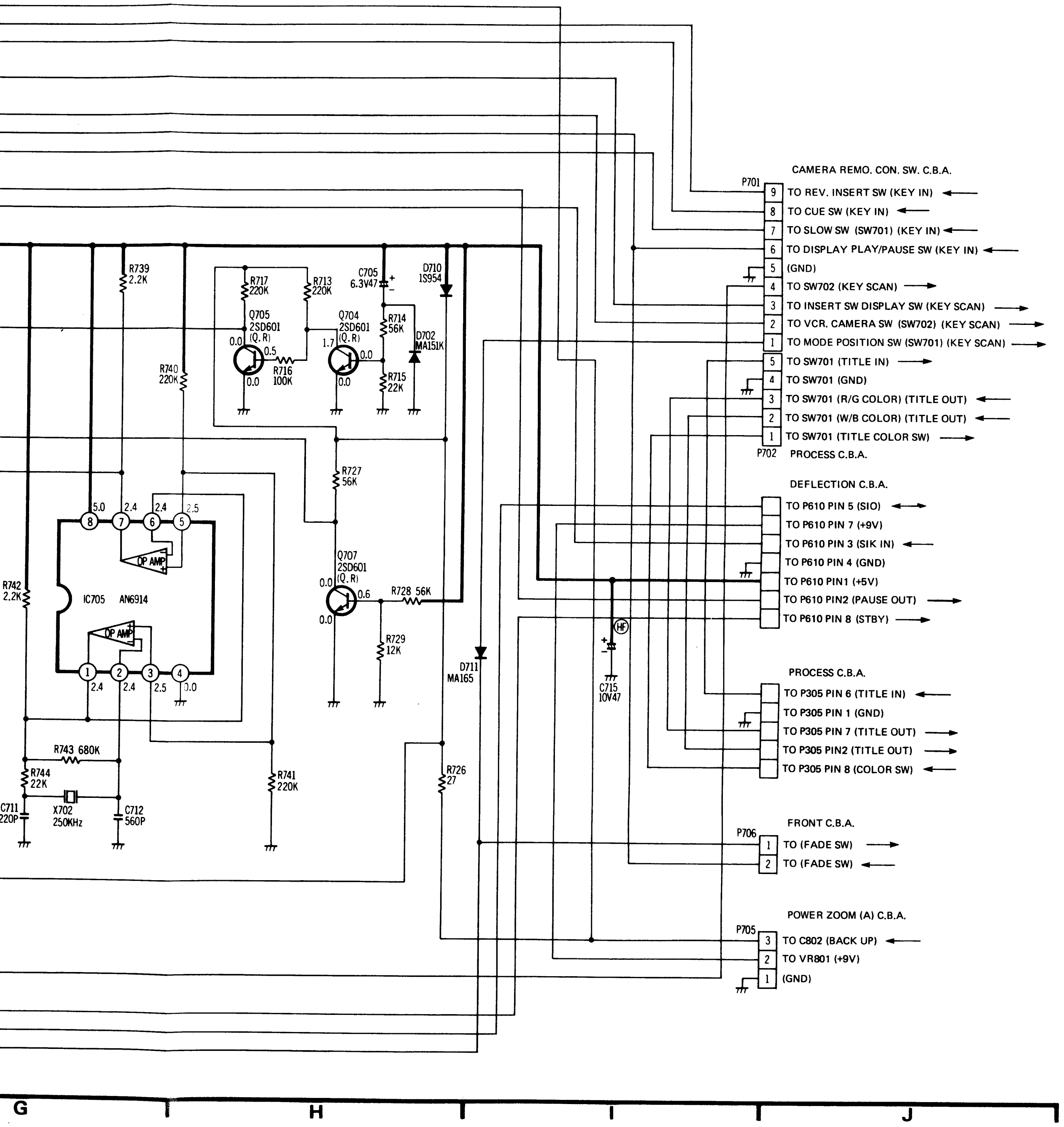
TALLY SW CIRCUIT BOARD (VEPW0111)



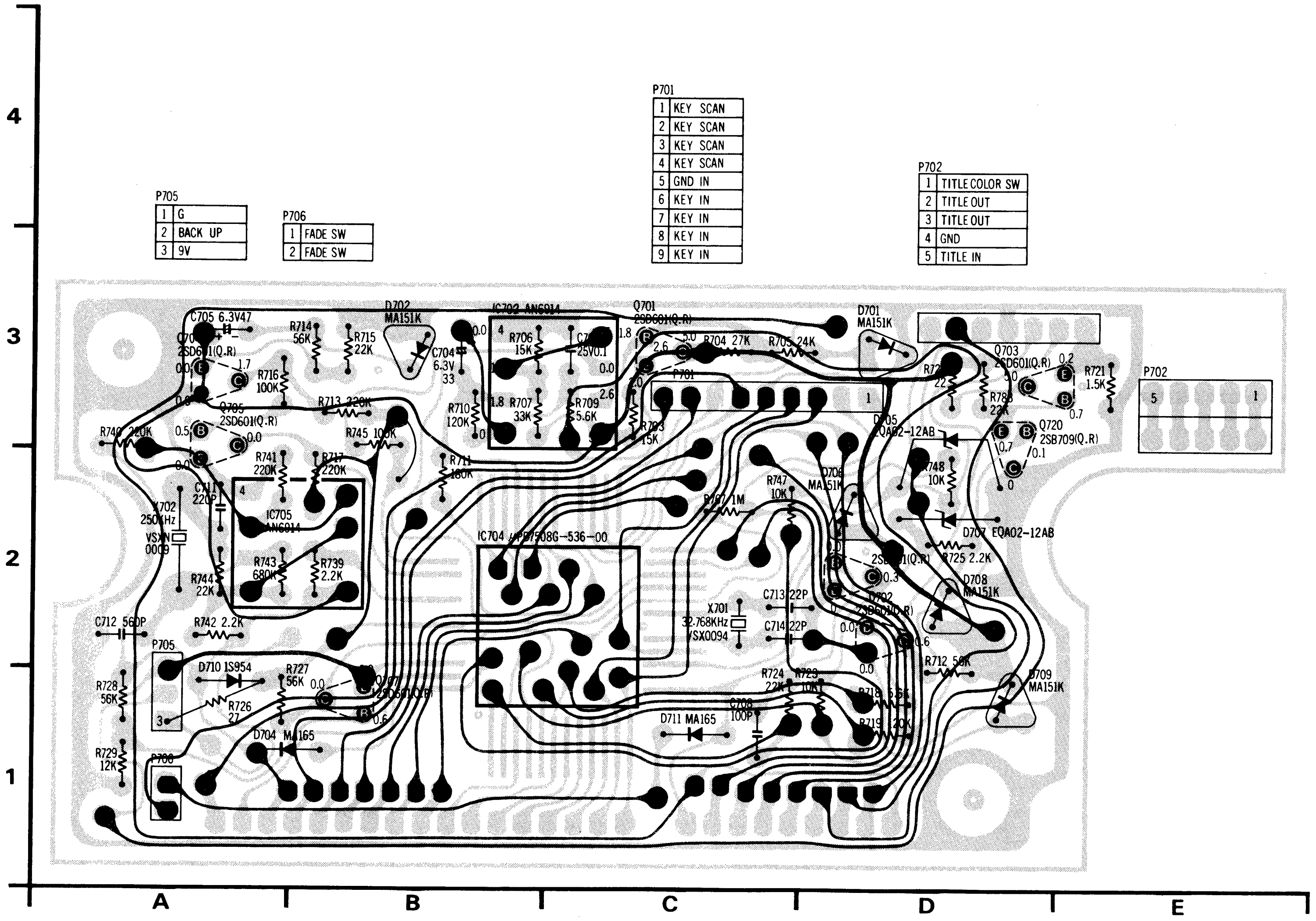
CAMERA REMOTE CONTROL (B) SCHEMATIC DIAGRAM



CAMERA REMO. CON. (A) C.B.A.
TO R781 (BACK UP)
TO IC703 PIN 2 (REC/REV)
TO P305 PIN 3 (FADE)
CAMERA REMO. CON. (A) C.B.A.
[+B (5V) LINE]
TO D718 (KEY SCAN)
TO P704 PIN 4 (TALLY)
TO R761 (PAUSE)
TO SW502 (KEY IN)
TO R732 (FADE LED)
TO R737 (REC LED)
TO R746
TO R775 (DATA WRITE)
TO R774 (DATA WRITE)
TO R773 (DATA WRITE)
TO Q721 (INF H)
TO R785 (INF H)
TO Q713 (C) (EXT SYBY)
TO Q712 (C) (EXT RUN)
TO Q711 (C) (EXT TIMER)
TO R772 (DATA WRITE)
TO R771 (DATA WRITE)
TO IC703 PIN 3 (SIO)
TO STANDBY SW (SW503) (KEY IN)
TO R767 (DATA WRITE)
TO R770 (DATA WRITE)
TO IC701 PIN 3 (DATA WRITE)
TO R768 (DATA WRITE)
X701 32.768KHz or VSX0094
C713 22P
C714 22P
R767 1M
IC704 μPD7508G-536
COUNT CLOCK GENERATOR
CL
CLOCK CONTROL
TIMER/EVENT COUNTER
PROGRAM COUNTER
ALU
CARRY
ACCUMU-LATOR
PROGRAM/MEMORY (2048×8bit)
INSTRUCTION DECODER
D REGISTER
E REGISTER
H REGISTER
L REGISTER
STACK POINTER
DATA MEMORY 128×4 bit
PORT 0 BUFFER
PORT 1 BUFFER
PORT 2 BUFFER
PORT 3 BUFFER
PORT 4 BUFFER
PORT 5 BUFFER
PORT 6 BUFFER
PORT 7 BUFFER
SYSTEM CLOCK GENERATOR
OFFERING CONTROL
SERIAL INTERFACE
R745 100K
R712 56K
R783 22K
R720 22
D709 MA151K
D704 MA165
D706 MA151K
R748 10K
R747 10K
D705 EQA02-12AB
D708 MA151K
R725 2.2K
Q702 2SD601 (Q.R)
Q720 2SB709 (Q.R)
Q703 2SD601 (Q.R)
R721 1.5K
R718 5.6K
R719 120K
R724 22K
C708 100P
R723 10K
Q706 2SD601 (Q.R)
D707 EQA02-12AB
R703 15K
Q701 2SD601 (Q.R)
R704 27K
R705 24K
D701 MA151K
R707 33K
AWC 5V
R709 5.6K
IC702 AN6914
OP AMP
C704 6.3V33
R710 120K
C703 25V 0.1
R711 180K
R706 15K
R739 2.2K
R740 220K
R742 2.2K
IC705 AN6914
R743 680K
R744 22K
C711 220P
X702 250KHz
C712 560P
R741 220K
R717 220K
R713 220K
C705 6.3V47
Q705 2SD601 (Q.R)
Q704 2SD601 (Q.R)
R716 100K
R714 56K
R715 22K
R727 56K
Q707 2SD601 (Q.R)
R728
R729 12K
1
2
3
4
A
B
C
D
E
F
G
H

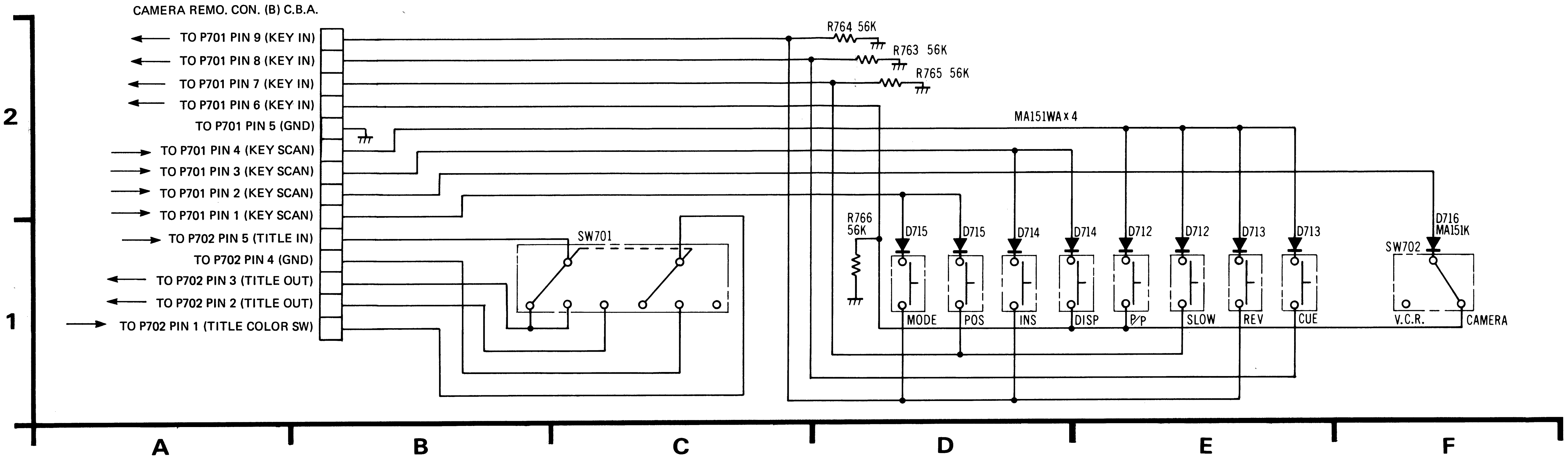

CAMERA REMO. CON. SW. C.B.A.
P701
9 TO REV. INSERT SW (KEY IN)
8 TO CUE SW (KEY IN)
7 TO SLOW SW (SW701) (KEY IN)
6 TO DISPLAY PLAY/PAUSE SW (KEY IN)
5 (GND)
4 TO SW702 (KEY SCAN)
3 TO INSERT SW DISPLAY SW (KEY SCAN)
2 TO VCR. CAMERA SW (SW702) (KEY SCAN)
1 TO MODE POSITION SW (SW701) (KEY SCAN)
5 TO SW701 (TITLE IN)
4 TO SW701 (GND)
3 TO SW701 (R/G COLOR) (TITLE OUT)
2 TO SW701 (W/B COLOR) (TITLE OUT)
1 TO SW701 (TITLE COLOR SW)
P702 PROCESS C.B.A.
DEFLECTION C.B.A.
TO P610 PIN 5 (SIO)
TO P610 PIN 7 (+9V)
TO P610 PIN 3 (SIK IN)
TO P610 PIN 4 (GND)
TO P610 PIN1 (+5V)
TO P610 PIN2 (PAUSE OUT)
TO P610 PIN 8 (STBY)
PROCESS C.B.A.
TO P305 PIN 6 (TITLE IN)
TO P305 PIN 1 (GND)
TO P305 PIN 7 (TITLE OUT)
TO P305 PIN2 (TITLE OUT)
TO P305 PIN 8 (COLOR SW)
FRONT C.B.A.
P706
1 TO (FADE SW)
2 TO (FADE SW)
POWER ZOOM (A) C.B.A.
P705
3 TO C802 (BACK UP)
2 TO VR801 (+9V)
1 (GND)
R739 2.2K
R717 220K
R713 220K
C705 6.3V47
D710 1S954
Q705 2SD601 (Q.R)
Q704 2SD601 (Q.R)
R714 56K
D702 MA151K
R716 100K
R715 22K
R740 220K
R727 56K
Q707 2SD601 (Q.R)
R728 56K
R729 12K
IC705 AN6914
OP AMP
R742 2.2K
R743 680K
R744 22K
X702 250KHz
C711 220P
C712 560P
R741 220K
D711 MA165
R726 27
C715 10V47
G
H
I
J

CAMERA REMOTE CONTROL (B) CIRCUIT BOARD (VEPW0195)

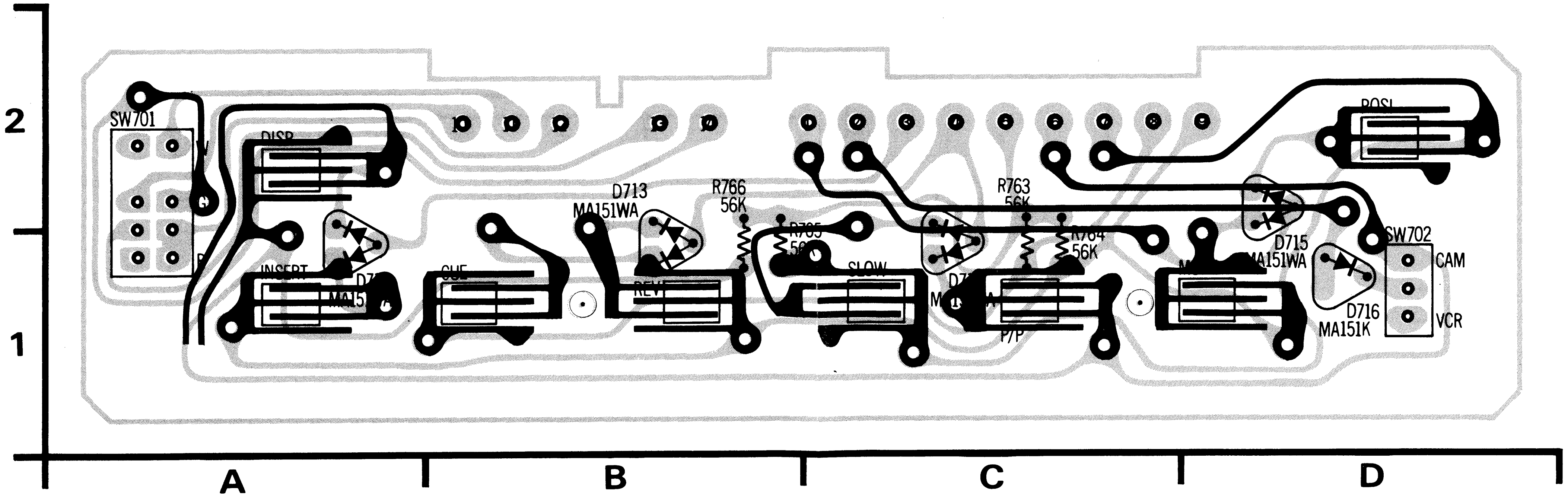

P701
1 KEY SCAN
2 KEY SCAN
3 KEY SCAN
4 KEY SCAN
5 GND IN
6 KEY IN
7 KEY IN
8 KEY IN
9 KEY IN
P702
1 TITLE COLOR SW
2 TITLE OUT
3 TITLE OUT
4 GND
5 TITLE IN
P705
1 G
2 BACK UP
3 9V
P706
1 FADE SW
2 FADE SW
IC703 AN6914
IC704 MN1508G-536-00
IC705 AN6914
D701 MA151K
D702 MA151K
Q701 2SD601(Q.R)
Q703 2SD601(Q.R)
Q720 2SB709(Q.R)
D705 EQA02-12AB
D707 EQA02-12AB
D708 MA151K
D709 MA151K
D710 1S954
D711 MA165
X701 32.768KHz VSX0094
X702 250KHz VSX0009
C712 560P
C713 22P
C714 22P
4
3
2
1
A
B
C
D
E

PIN NO.	IC704			
	INF	TITLE	SW	DATE
1	0.0	0.0	0.0	0.0
2	4.4	4.5	4.4	4.5
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0
5	2.4	2.4	2.4	2.4
6	0.0	0.0	0.0	0.0
7	4.4	4.5	4.4	4.5
8	0.0	0.0	0.0	0.0
9	2.2	2.2	2.2	2.2
10	0.0	0.0	0.0	0.0
11	5.0	5.1	5.1	5.1
12	1.1	4.8	1.2	4.8
13	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0
15	0.2	0.0	0.2	0.0
16	4.5	0.3	4.0	0.3
17	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.0	0.0	4.3	0.0
21	0.0	0.8	0.0	0.0
22	0.2	3.7	3.6	3.6
23	0.0	0.8	0.0	3.3
24	0.1	0.8	0.1	3.3
25	3.7	1.4	0.3	0.9
26	0.3	4.3	3.6	3.9
27	0.0	0.0	0.0	0.0
28	3.9	4.3	3.5	4.0
29	0.0	0.0	0.0	0.0
30	0.5	3.7	3.9	3.5
31	0.0	0.0	0.0	0.0
32	1.6	1.6	1.6	1.6
33	4.4	4.5	4.4	4.5
34	2.1	2.1	2.1	2.1
35	0.0	0.0	0.0	0.0
36	0.0	0.0	0.0	0.0
37	4.4	4.5	0.0	4.4
38	0.0	0.0	0.0	0.0
39	0.0	0.0	4.4	0.0
40	0.0	0.0	0.0	0.0
41	0.0	0.0	0.0	0.0
42	0.0	0.0	0.0	0.0
43	0.0	0.0	0.0	0.0
44	0.5	3.3	3.5	3.1
45	0.0	0.0	0.0	0.0
46	0.0	4.5	0.0	4.5
47	4.4	0.0	0.0	0.0
48	4.4	4.4	4.3	4.3
49	0.1	0.1	0.1	0.1
50	4.9	4.9	4.9	4.9
51	4.9	4.9	4.9	4.9
52	4.9	4.9	4.9	4.9

CAMERA REMOTE CONTROL SW SCHEMATIC DIAGRAM


CAMERA REMO. CON. (B) C.B.A.
TO P701 PIN 9 (KEY IN)
TO P701 PIN 8 (KEY IN)
TO P701 PIN 7 (KEY IN)
TO P701 PIN 6 (KEY IN)
TO P701 PIN 5 (GND)
TO P701 PIN 4 (KEY SCAN)
TO P701 PIN 3 (KEY SCAN)
TO P701 PIN 2 (KEY SCAN)
TO P701 PIN 1 (KEY SCAN)
TO P702 PIN 5 (TITLE IN)
TO P702 PIN 4 (GND)
TO P702 PIN 3 (TITLE OUT)
TO P702 PIN 2 (TITLE OUT)
TO P702 PIN 1 (TITLE COLOR SW)
SW701
R764 56K
R763 56K
R765 56K
MA151WA x 4
R766
56K
D715
D715
D714
D714
D712
D712
D713
D713
D716
MA151K
SW702
MODE
POS
INS
DISP
P/P
SLOW
REV
CUE
V.C.R.
CAMERA
2
1
A
B
C
D
E
F

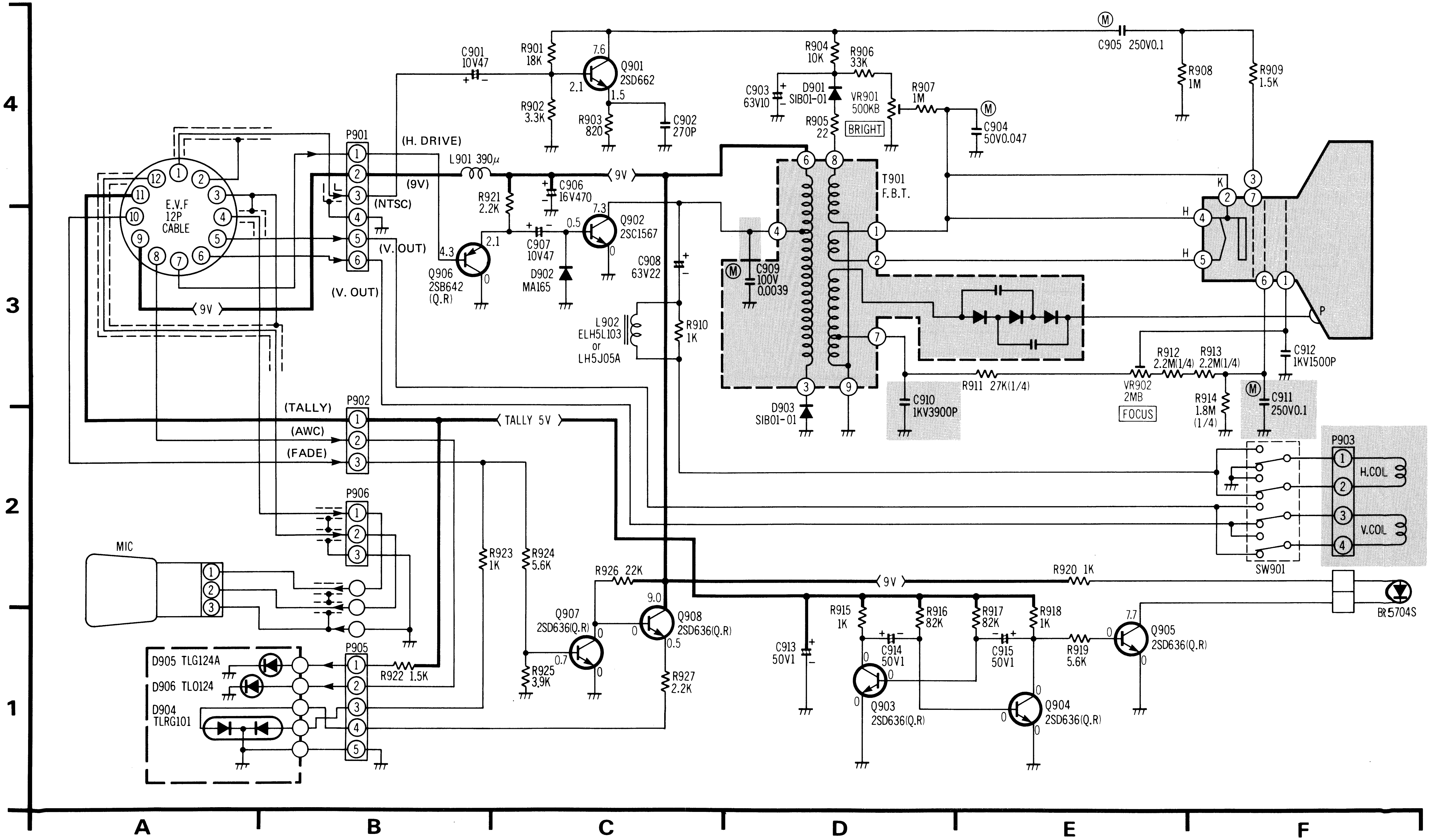
CAMERA REMOTE CONTROL SW CIRCUIT BOARD (VEPW0197)


SW701
DISP
INSERT
MA151WA
CUE
D713
MA151WA
REV
R766
56K
R765
56K
SLOW
R763
56K
R764
56K
P/P
POSI
D715
MA151WA
D716
MA151K
SW702
CAM
VCR
2
1
A
B
C
D

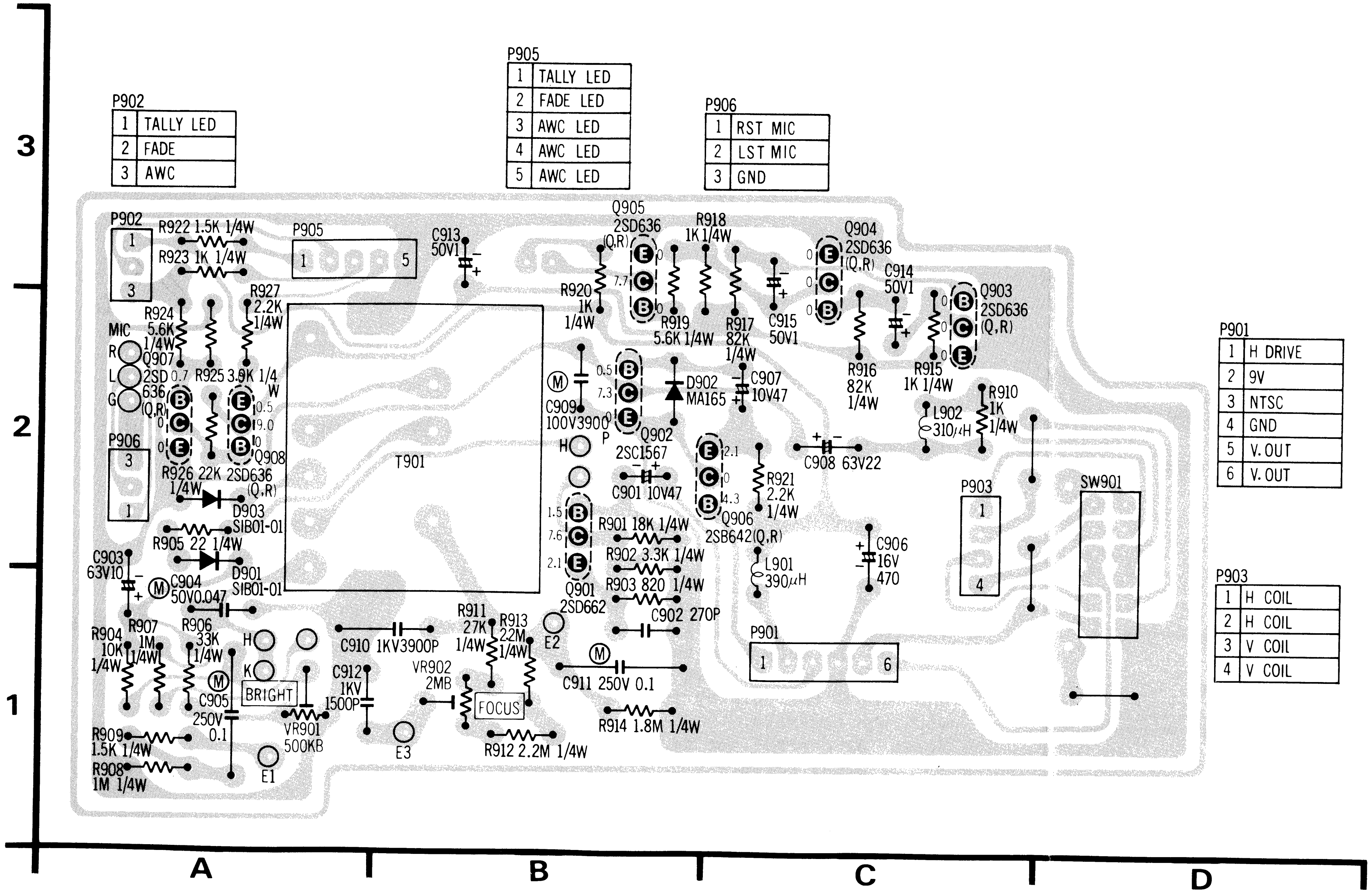
ELECTRONIC VIEWFINDER SCHEMATIC DIAGRAM

PRODUCT SAFETY NOTE

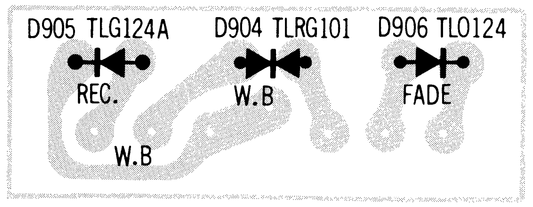
The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards when servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.


4
3
2
1
A
B
C
D
E
F
E.V.F
12P
CABLE
P901
(H. DRIVE)
(9V)
(NTSC)
(V. OUT)
(V. OUT)
9V
C901
10V47
R901
18K
R902
3.3K
7.6
2.1
Q901
2SD662
1.5
R903
820
C902
270P
L901 390μ
9V
C906
16V470
R921
2.2K
7.3
Q902
2SC1567
0.5
0
C907
10V47
2.1
4.3
Q906
2SB642
(Q.R)
0
D902
MA165
C908
63V22
L902
ELH5L103
or
LH5J05A
R910
1K
R904
10K
R906
33K
C903
63V10
D901
SIB01-01
VR901
500KB
BRIGHT
R905
22
R907
1M
C904
50V0.047
M
C905 250V0.1
R908
1M
R909
1.5K
T901
F.B.T.
C909
100V
0.0039
D903
SIB01-01
C910
1KV3900P
R911 27K(1/4)
VR902
2MB
FOCUS
R912
2.2M(1/4)
R913
2.2M(1/4)
R914
1.8M
(1/4)
C911
250V0.1
C912
1KV1500P
K
H
H
P
P902
(TALLY)
(AWC)
(FADE)
TALLY 5V
P906
MIC
P905
D905 TLG124A
D906 TLO124
D904
TLRG101
R922 1.5K
R923
1K
R924
5.6K
R926 22K
9.0
Q907
2SD636(Q.R)
0.7
0
Q908
2SD636(Q.R)
0
0.5
R925
3.9K
R927
2.2K
9V
R920 1K
C913
50V1
R915
1K
C914
50V1
R916
82K
R917
82K
C915
50V1
R918
1K
R919
5.6K
7.7
Q905
2SD636(Q.R)
0
Q903
2SD636(Q.R)
0
Q904
2SD636(Q.R)
0
SW901
P903
H.COL
V.COL
BR5704S

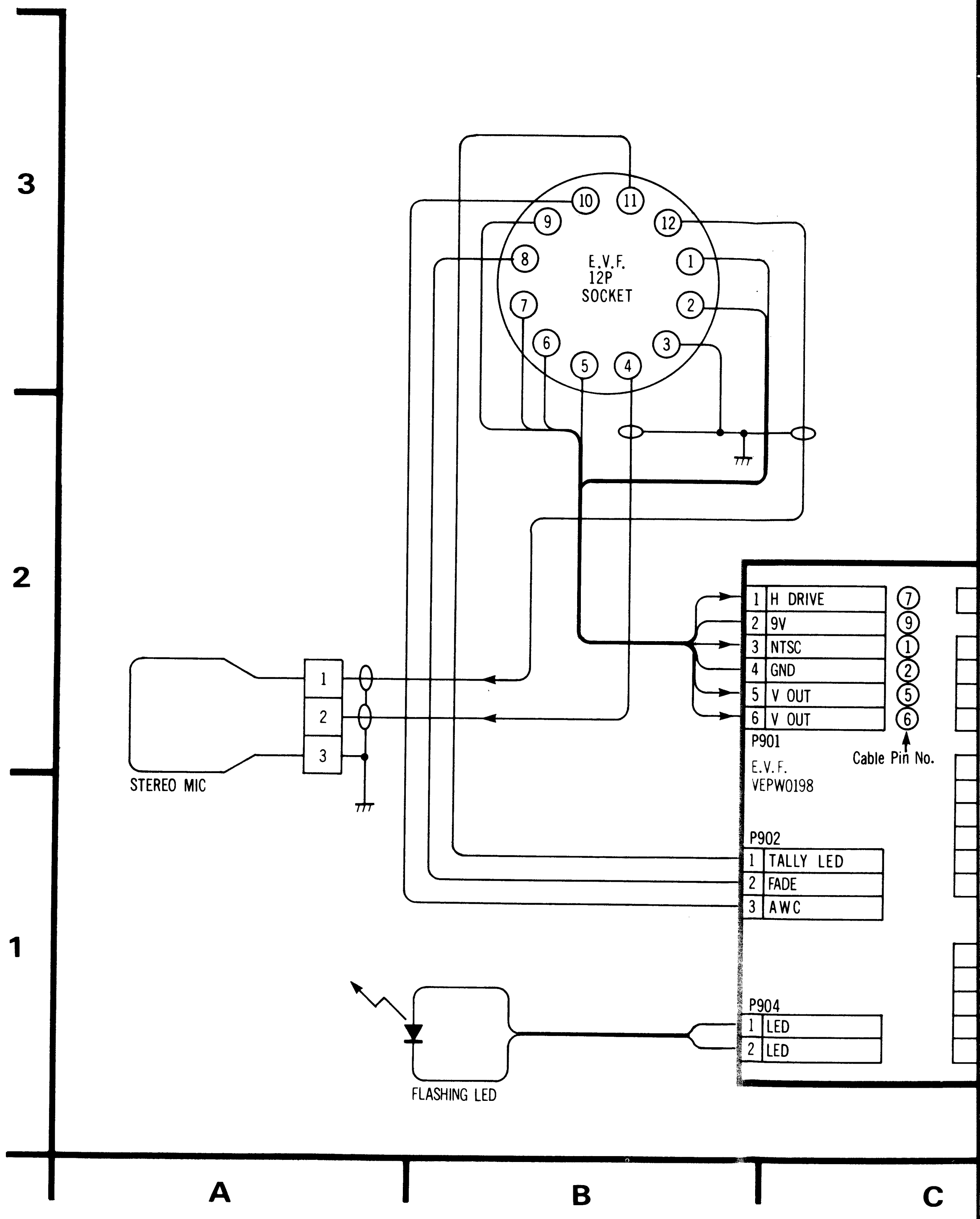
ELECTRONIC VIEWFINDER CIRCUIT BOARD (VEPW0198)


3
2
1
A
B
C
D
P902
1 TALLY LED
2 FADE
3 AWC
P905
1 TALLY LED
2 FADE LED
3 AWC LED
4 AWC LED
5 AWC LED
P906
1 RST MIC
2 LST MIC
3 GND
P901
1 H DRIVE
2 9V
3 NTSC
4 GND
5 V.OUT
6 V.OUT
P903
1 H COIL
2 H COIL
3 V COIL
4 V COIL
R922 1.5K 1/4W
R923 1K 1/4W
R927 2.2K 1/4W
R924 5.6K 1/4W
MIC
Q907 2SD636 (Q,R)
R925 3.9K 1/4W
Q908 2SD636 (Q,R)
R926 22K 1/4W
D903 SIB01-01
R905 22 1/4W
D901 SIB01-01
C903 63V10
C904 50V0.047
R904 10K 1/4W
R907 1M 1/4W
R906 33K 1/4W
C905 250V 0.1
BRIGHT
VR901 500KB
R909 1.5K 1/4W
R908 1M 1/4W
E1
C910 1KV3900P
C912 1KV 1500P
E3
VR902 2MB
FOCUS
R911 27K 1/4W
R913 22M 1/4W
R912 2.2M 1/4W
E2
C913 50V1
T901
Q905 2SD636 (Q,R)
R920 1K 1/4W
R918 1K 1/4W
R919 5.6K 1/4W
R917 82K 1/4W
C915 50V1
C909 100V3900P
D902 MA165
C907 10V47
Q902 2SC1567
C901 10V47
Q906 2SB642(Q,R)
R921 2.2K 1/4W
Q901 2SD662
R901 18K 1/4W
R902 3.3K 1/4W
R903 820 1/4W
C902 270P
L901 390μH
C911 250V 0.1
R914 1.8M 1/4W
Q904 2SD636 (Q,R)
C914 50V1
R916 82K 1/4W
R915 1K 1/4W
Q903 2SD636 (Q,R)
R910 1K 1/4W
L902 310μH
C908 63V22
C906 16V 470
P903
SW901
P901
H
K
P

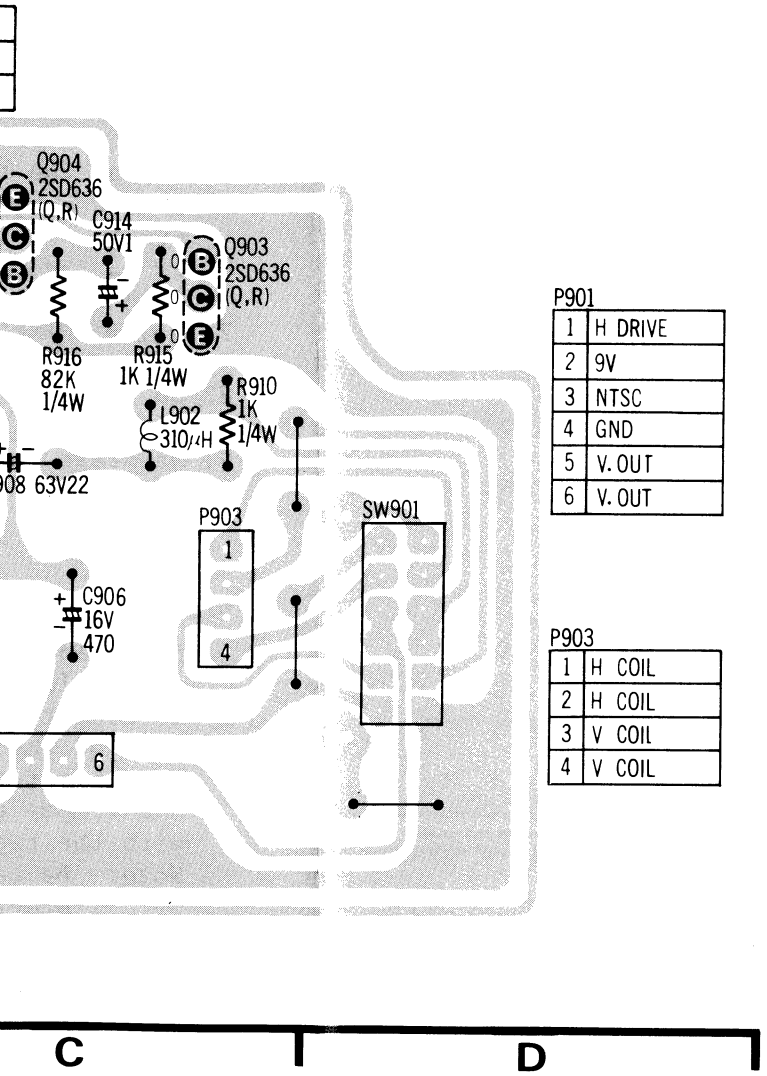
EVF LED CIRCUIT BOARD
(VEPW0123B)


D905 TLG124A
D904 TLRG101
D906 TLO124
REC.
W.B
FADE
W.B

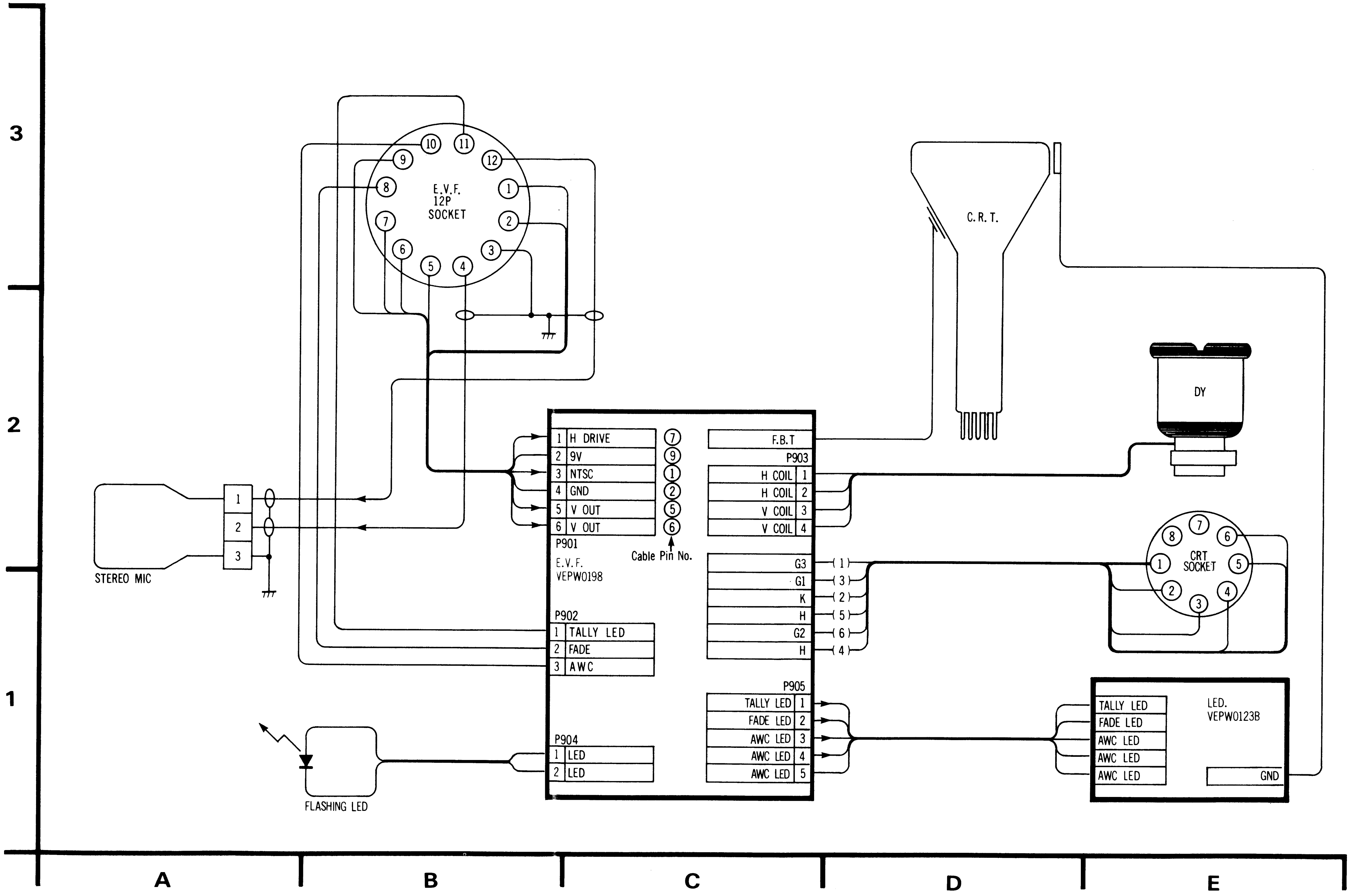
ELECTRONIC VIEWFINDER INTERCONNECTIO


3
2
1
A
B
C
E.V.F. 12P SOCKET
1 2 3 4 5 6 7 8 9 10 11 12
STEREO MIC
1
2
3
P901
1 H DRIVE
2 9V
3 NTSC
4 GND
5 V OUT
6 V OUT
E.V.F. VEPW0198
Cable Pin No.
P902
1 TALLY LED
2 FADE
3 AWC
P904
1 LED
2 LED
FLASHING LED

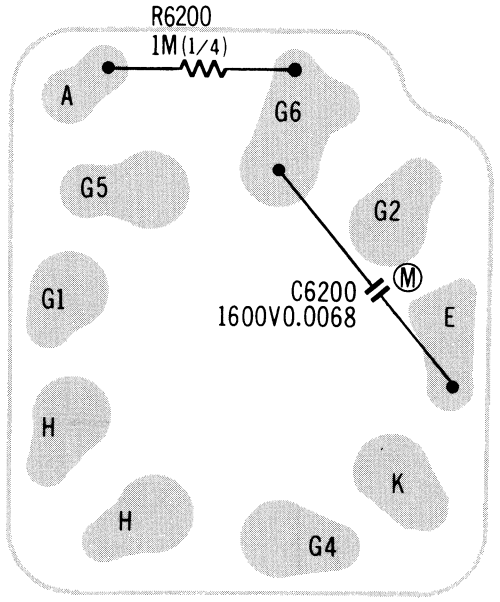
VEPW0198)


Q904
2SD636
(Q,R)
E
C
B
C914
50V1
Q903
2SD636
(Q,R)
B
C
E
R916
82K
1/4W
R915
1K 1/4W
R910
1K
1/4W
L902
310μH
908 63V22
P903
1
4
SW901
C906
16V
470
6
P901
1 H DRIVE
2 9V
3 NTSC
4 GND
5 V.OUT
6 V.OUT
P903
1 H COIL
2 H COIL
3 V COIL
4 V COIL
C
D

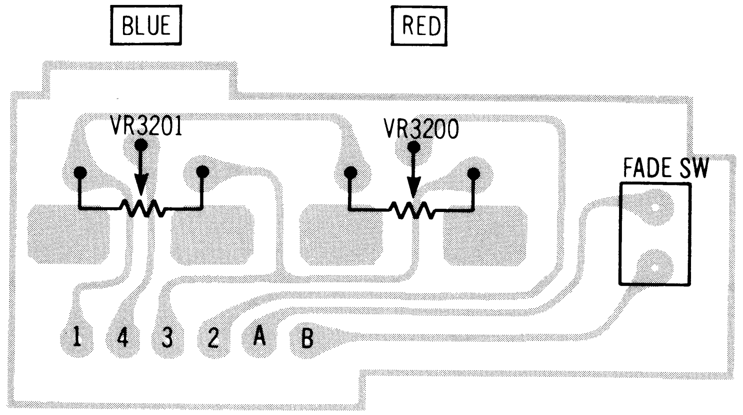
ELECTRONIC VIEWFINDER INTERCONNECTION SCHEMATIC DIAGRAM


3
2
1
A
B
C
D
E
E.V.F.
12P
SOCKET
1
2
3
4
5
6
7
8
9
10
11
12
C.R.T.
DY
STEREO MIC
1
2
3
P901
1 H DRIVE
2 9V
3 NTSC
4 GND
5 V OUT
6 V OUT
7
9
1
2
5
6
Cable Pin No.
E.V.F.
VEPW0198
F.B.T
P903
H COIL 1
H COIL 2
V COIL 3
V COIL 4
G3
G1
K
H
G2
H
1
3
2
5
6
4
CRT
SOCKET
1
2
3
4
5
6
7
8
P902
1 TALLY LED
2 FADE
3 AWC
P904
1 LED
2 LED
FLASHING LED
P905
TALLY LED 1
FADE LED 2
AWC LED 3
AWC LED 4
AWC LED 5
TALLY LED
FADE LED
AWC LED
AWC LED
AWC LED
LED.
VEPW0123B
GND

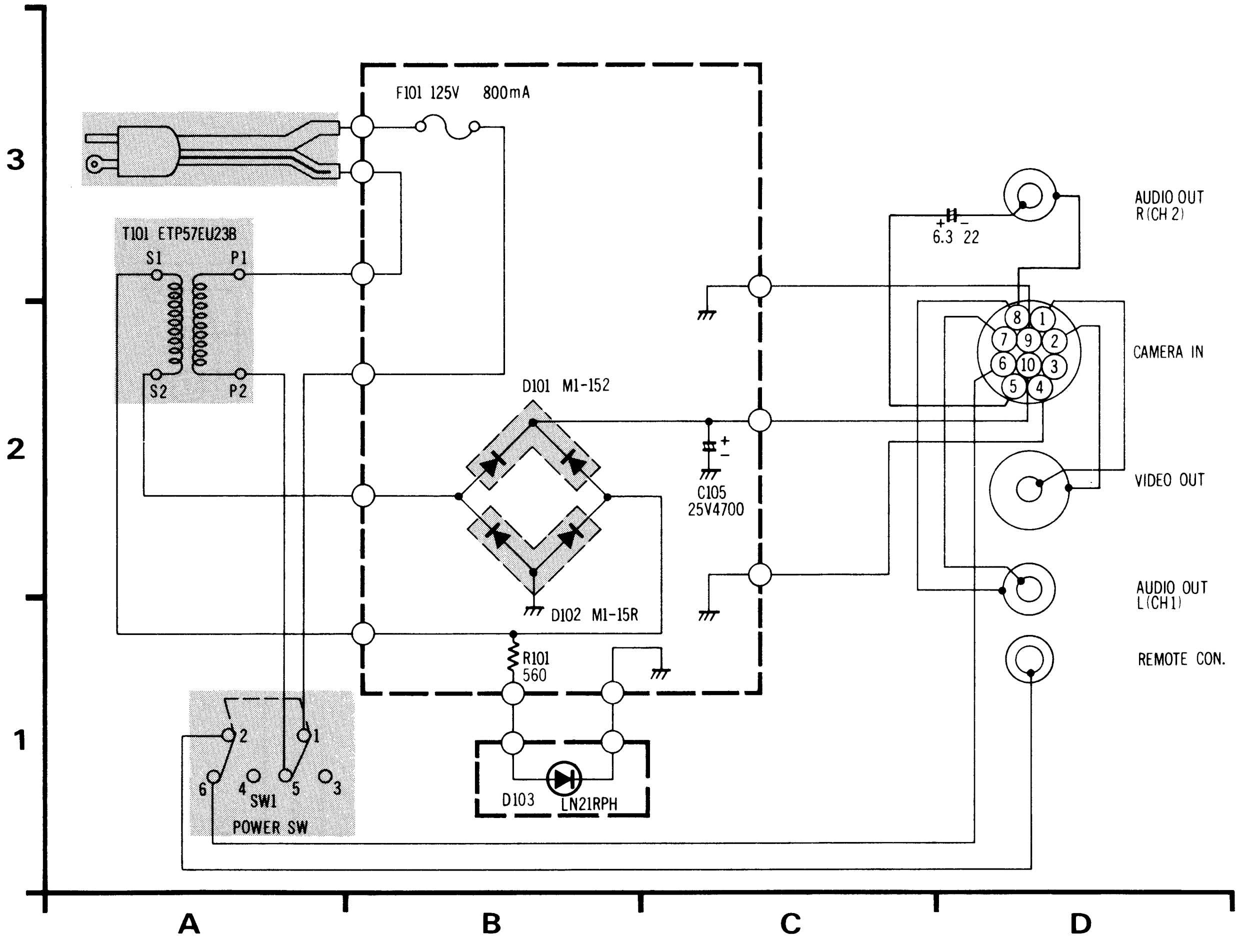
NEWVICON SOCKET CIRCUIT BOARD
(VEPW0109B)


R6200
1M(1/4)
A
G6
G5
G2
G1
C6200
1600V0.0068
Ⓜ
E
H
H
K
G4

FRONT CIRCUIT BOARD (VEPW0194)


BLUE
RED
VR3201
VR3200
FADE SW
1
4
3
2
A
B

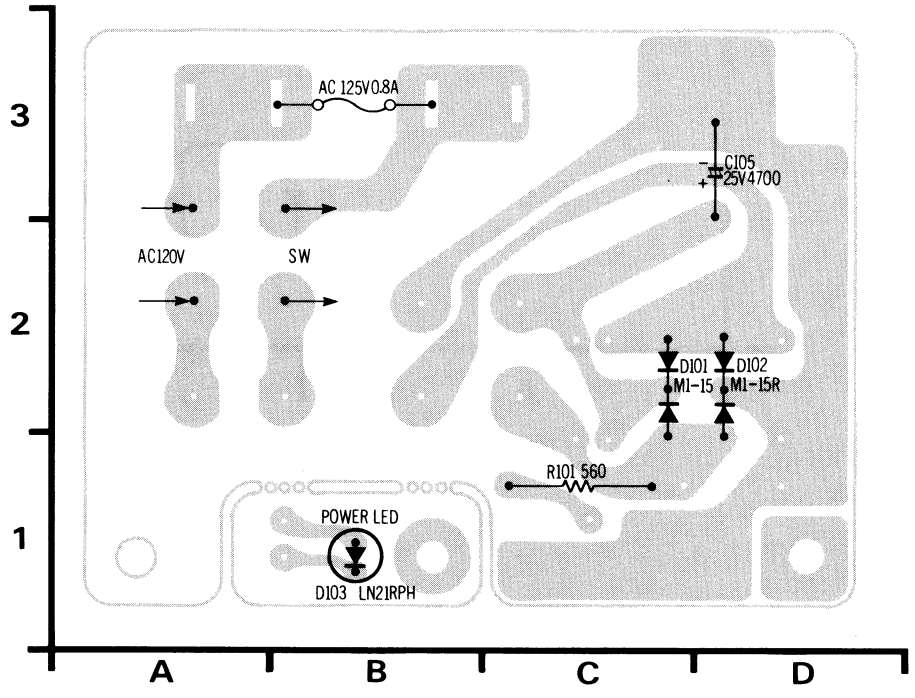
POWER SUPPLY SCHEMATIC DIAGRAM
(OPTIONAL ACCESSORY)


3
2
1
A
B
C
D
F101 125V 800mA
T101 ETP57EU23B
S1
P1
S2
P2
D101 M1-152
C105
25V4700
D102 M1-15R
R101
560
D103
LN21RPH
SW1
POWER SW
2
1
6
4
5
3
6.3 22
AUDIO OUT
R(CH 2)
CAMERA IN
VIDEO OUT
AUDIO OUT
L(CH1)
REMOTE CON.
8
1
7
9
2
6
10
3
5
4

PRODUCT SAFETY NOTE

The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards when servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

POWER SUPPLY CIRCUIT BOARD


3
2
1
A
B
C
D
AC 125V0.8A
C105
25V4700
AC120V
SW
D101
M1-15
D102
M1-15R
R101 560
POWER LED
D103 LN21RPH

A. Precautions
ponent

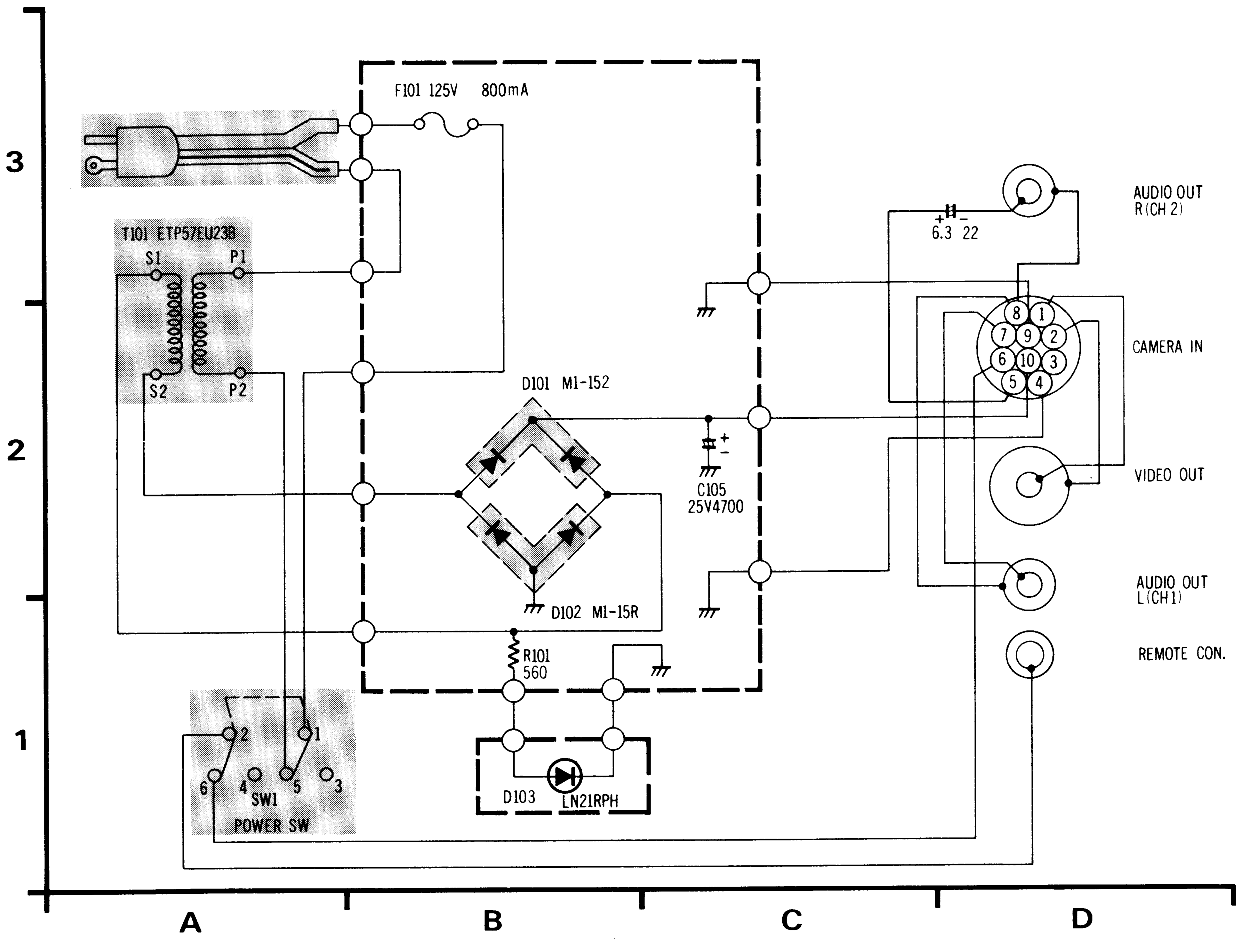
1. Make sure t
before repl
2. Use tweezer
prevent any
face.
3. Do not re-u
moval.
4. Do not rub
5. Do not subj
stress.
6. It is recom
soldering i
7. Solder with
0.5mm is re
8. Do not heat
seconds.
9. Maintain th
(500°F) whe

B. Removal

1. Add solder
(three lead
2. Holding the
ends of the
the chip tr
and remove
with the tw
Note: Be c
othe

Chip
Soldering

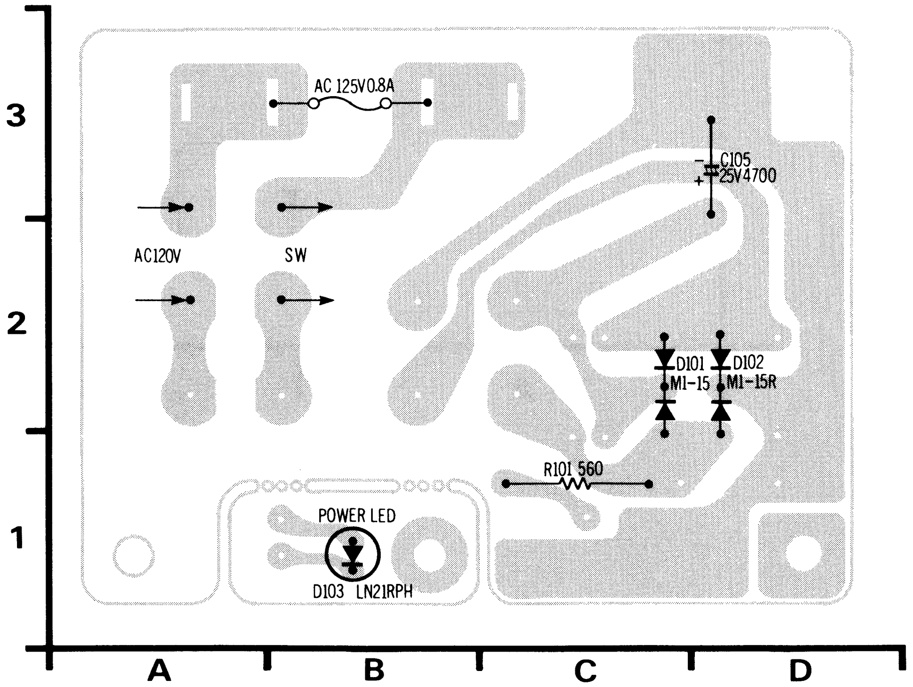
POWER SUPPLY SCHEMATIC DIAGRAM
(OPTIONAL ACCESSORY)


3
2
1
A
B
C
D
F101 125V 800mA
T101 ETP57EU23B
S1
P1
S2
P2
D101 M1-152
D102 M1-15R
C105
25V4700
6.3 22
R101
560
D103
LN21RPH
SW1
POWER SW
6
4
5
3
2
1
AUDIO OUT
R(CH 2)
CAMERA IN
VIDEO OUT
AUDIO OUT
L(CH1)
REMOTE CON.

PRODUCT SAFETY NOTE

The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards when servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

POWER SUPPLY CIRCUIT BOARD


3
2
1
A
B
C
D
AC 125V0.8A
AC120V
SW
C105
25V4700
D101
M1-15
D102
M1-15R
R101 560
POWER LED
D103 LN21RPH

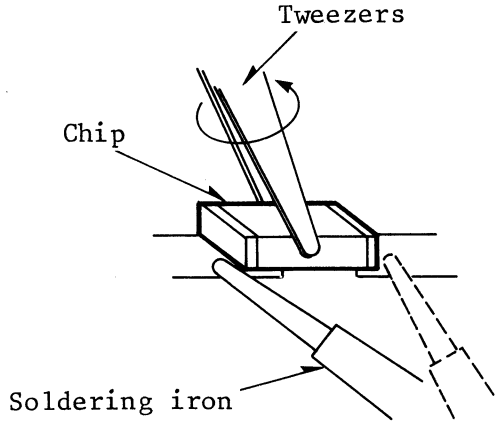
Chip Components

A. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF before replacing the chip.
2. Use tweezers to handle the chip to prevent any damage to the chip surface.
3. Do not re-use the chips after removal.
4. Do not rub the electrode of the chips.
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron be used.
7. Solder with diameter of less than 0.5mm is recommended.
8. Do not heat the chip from more than 3 seconds.
9. Maintain the temperature under 260°C (500°F) when soldering.

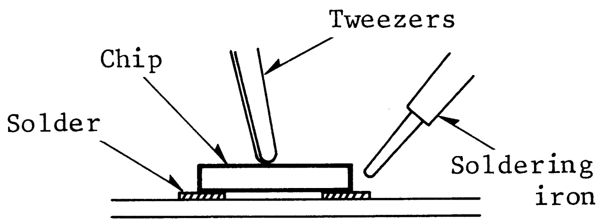
B. Removal

1. Add solder to both ends of the chip (three leads on the chip transistor).
2. Holding the soldering iron to both ends of the chip (the three leads on the chip transistor) as shown below and remove the chip by turning it with the tweezers.
   Note: Be careful not to damage the other chips.

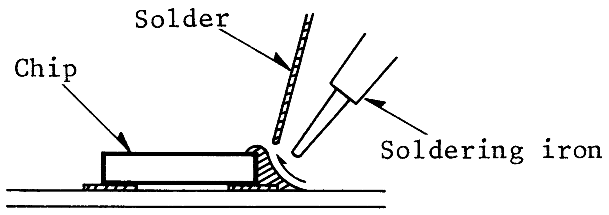

Tweezers
Chip
Soldering iron

C. Mounting

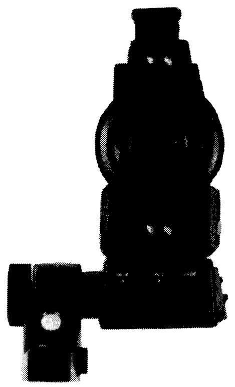
1. Apply the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers.


Tweezers
Chip
Solder
Soldering
iron

3. Solder both ends of the chip (three leads on the chip tarnsistor).

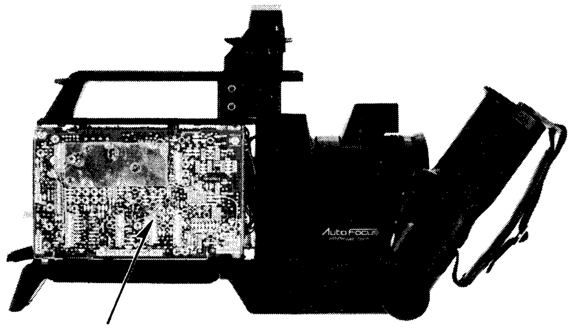

Solder
Chip
Soldering iron

CIRCUIT BOARD LAYOUT



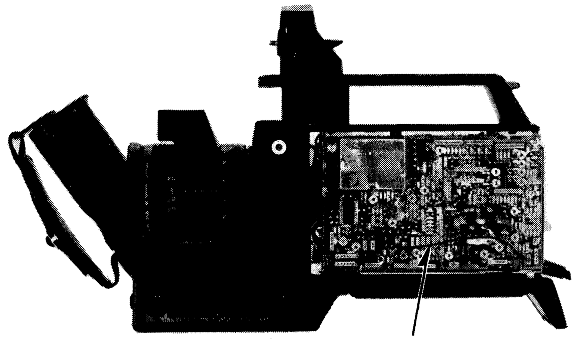
Right Side View II
Left Side View
Right Side View I

Left Side View



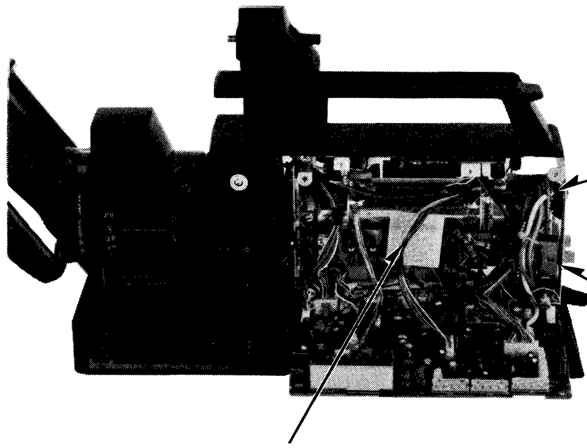
Process Circuit Board
(VEPW0188)

Right Side View I



Deflection Circuit Board
(VEPW0189)

Right Side View II

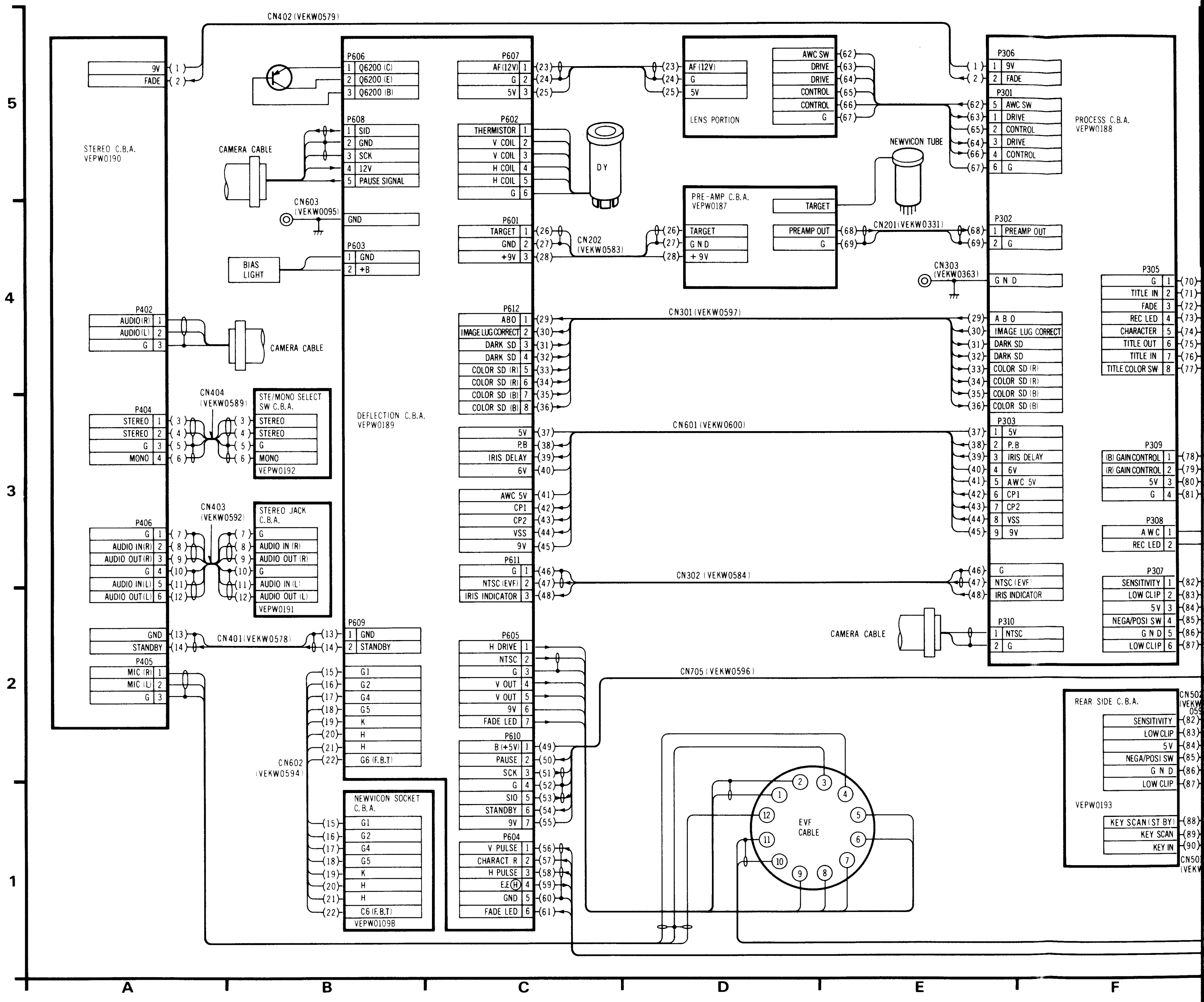


Newvicon Socket
Circuit Board
(VEPW0109B)

Rear Side Circuit Board
(VEPW0193)

Pre-Amp Circuit Board
(VEPW0187)

CAMERA UNIT INTERCONNECTION SCHEMATIC DIAGRAM

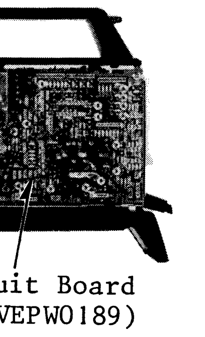


5
4
3
2
1
A
B
C
D
E
F
CN402 (VEKW0579)
STEREO C.B.A.
VEPW0190
9V
FADE
P402
AUDIO (R)
AUDIO (L)
G
P404
STEREO
STEREO
G
MONO
P406
G
AUDIO IN (R)
AUDIO OUT (R)
G
AUDIO IN (L)
AUDIO OUT (L)
GND
STANDBY
P405
MIC (R)
MIC (L)
G
CAMERA CABLE
CN603
(VEKW0095)
BIAS
LIGHT
CAMERA CABLE
CN404
(VEKW0589)
STE/MONO SELECT
SW C.B.A.
STEREO
STEREO
G
MONO
VEPW0192
CN403
(VEKW0592)
STEREO JACK
C.B.A.
G
AUDIO IN (R)
AUDIO OUT (R)
G
AUDIO IN (L)
AUDIO OUT (L)
VEPW0191
CN401 (VEKW0578)
CN602
(VEKW0594)
P606
Q6200 (C)
Q6200 (E)
Q6200 (B)
P608
SID
GND
SCK
12V
PAUSE SIGNAL
GND
P603
GND
+B
DEFLECTION C.B.A.
VEPW0189
P609
GND
STANDBY
G1
G2
G4
G5
K
H
H
G6 (F.B.T)
NEWVICON SOCKET
C.B.A.
G1
G2
G4
G5
K
H
H
C6 (F.B.T)
VEPW0109B
P607
AF (12V)
G
5V
P602
THERMISTOR
V COIL
V COIL
H COIL
H COIL
G
DY
P601
TARGET
GND
+9V
CN202
(VEKW0583)
P612
ABO
IMAGE LUG CORRECT
DARK SD
DARK SD
COLOR SD (R)
COLOR SD (R)
COLOR SD (B)
COLOR SD (B)
5V
P.B
IRIS DELAY
6V
AWC 5V
CP1
CP2
VSS
9V
P611
G
NTSC (EVF)
IRIS INDICATOR
P605
H DRIVE
NTSC
G
V OUT
V OUT
9V
FADE LED
P610
B (+5V)
PAUSE
SCK
G
SIO
STANDBY
9V
P604
V PULSE
CHARACT R
H PULSE
E.E(H)
GND
FADE LED
AF (12V)
G
5V
LENS PORTION
AWC SW
DRIVE
DRIVE
CONTROL
CONTROL
G
PRE-AMP C.B.A.
VEPW0187
TARGET
G N D
+ 9V
TARGET
PREAMP OUT
G
NEWVICON TUBE
CN201 (VEKW0331)
CN303
(VEKW0363)
CN301 (VEKW0597)
CN601 (VEKW0600)
CN302 (VEKW0584)
CN705 (VEKW0596)
CAMERA CABLE
EVF
CABLE
P306
9V
FADE
P301
AWC SW
DRIVE
CONTROL
DRIVE
CONTROL
G
PROCESS C.B.A.
VEPW0188
P302
PREAMP OUT
G
G N D
A B O
IMAGE LUG CORRECT
DARK SD
DARK SD
COLOR SD (R)
COLOR SD (R)
COLOR SD (B)
COLOR SD (B)
P303
5V
P.B
IRIS DELAY
6V
AWC 5V
CP1
CP2
VSS
9V
G
NTSC (EVF)
IRIS INDICATOR
P310
NTSC
G
P305
G
TITLE IN
FADE
REC LED
CHARACTER
TITLE OUT
TITLE IN
TITLE COLOR SW
P309
(B) GAIN CONTROL
(R) GAIN CONTROL
5V
G
P308
A W C
REC LED
P307
SENSITIVITY
LOW CLIP
5 V
NEGA/POSI SW
G N D
LOW CLIP
REAR SIDE C.B.A.
SENSITIVITY
LOW CLIP
5 V
NEGA/POSI SW
G N D
LOW CLIP
VEPW0193
KEY SCAN (ST BY)
KEY SCAN
KEY IN
CN502
(VEKW
059
CN50
(VEKW

CAMERA UNIT INTERCONNECTION SCHEMATIC DIAGRAM

ew II

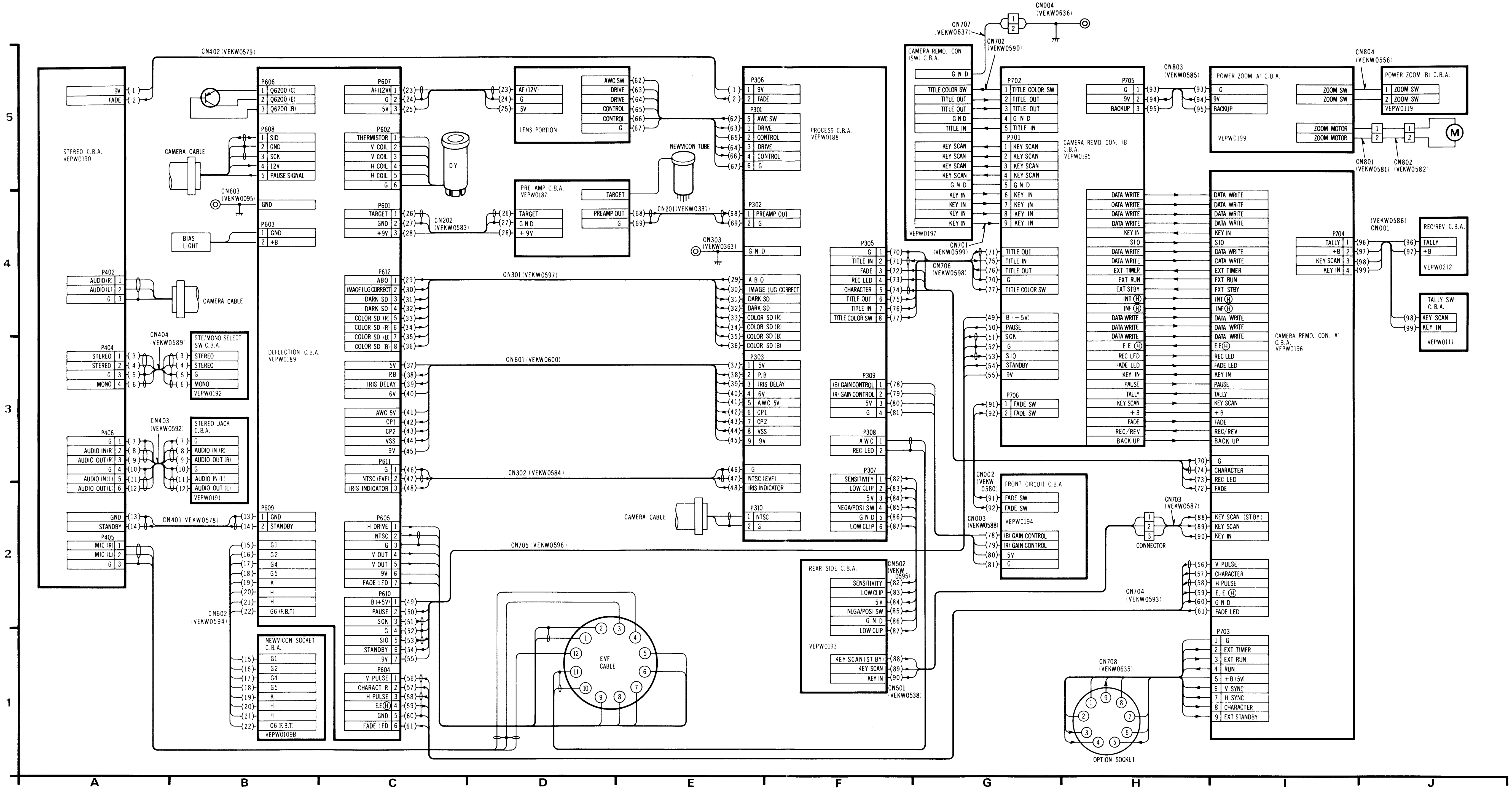
iew I



uit Board
(VEPW0189)

vicon Socket
Circuit Board
(VEPW0109B)

Circuit Board
(VEPW0193)



STEREO C.B.A.
VEPW0190
CN402 (VEKW0579)
9V
FADE
P402
AUDIO (R)
AUDIO (L)
G
P404
STEREO
MONO
P406
AUDIO IN (R)
AUDIO OUT (R)
AUDIO IN (L)
AUDIO OUT (L)
GND
STANDBY
P405
MIC (R)
MIC (L)
CN404 (VEKW0589)
ST/MONO SELECT SW C.B.A.
VEPW0192
CN403 (VEKW0592)
STEREO JACK C.B.A.
VEPW0191
CN401 (VEKW0578)
CAMERA CABLE
CN603 (VEKW0095)
BIAS LIGHT
CN602 (VEKW0594)
P606
Q6200 (C)
Q6200 (E)
Q6200 (B)
P608
SID
GND
SCK
12V
PAUSE SIGNAL
P603
+B
P609
G1
G2
G4
G5
K
H
G6 (F.B.T)
NEWVICON SOCKET C.B.A.
VEPW0109B
DEFLECTION C.B.A.
VEPW0189
P607
AF (12V)
5V
P602
THERMISTOR
V COIL
H COIL
DY
P601
TARGET
+9V
CN202 (VEKW0583)
P612
ABO
IMAGE LUG CORRECT
DARK SD
COLOR SD (R)
COLOR SD (B)
P.B
IRIS DELAY
6V
AWC 5V
CP1
CP2
VSS
9V
P611
NTSC (EVF)
IRIS INDICATOR
P605
H DRIVE
NTSC
V OUT
FADE LED
P610
B (+5V)
PAUSE
SCK
SIO
STANDBY
P604
V PULSE
CHARACT R
H PULSE
E.E (H)
LENS PORTION
AWC SW
DRIVE
CONTROL
PRE-AMP C.B.A.
VEPW0187
PREAMP OUT
CN201 (VEKW0331)
NEWVICON TUBE
CN303 (VEKW0363)
CN301 (VEKW0597)
CN601 (VEKW0600)
CN302 (VEKW0584)
CN705 (VEKW0596)
EVF CABLE
P306
P301
P302
P303
P310
PROCESS C.B.A.
VEPW0188
P305
TITLE IN
TITLE OUT
REC LED
CHARACTER
TITLE COLOR SW
P309
(B) GAIN CONTROL
(R) GAIN CONTROL
P308
AWC
P307
SENSITIVITY
LOW CLIP
NEGA/POSI SW
REAR SIDE C.B.A.
VEPW0193
CN502 (VEKW 0595)
KEY SCAN (ST BY)
KEY SCAN
KEY IN
CN501 (VEKW0538)
CN707 (VEKW0637)
CN004 (VEKW0636)
CN702 (VEKW0590)
CAMERA REMO. CON. (SW) C.B.A.
VEPW0197
CN701 (VEKW0599)
CN706 (VEKW0598)
P702
P701
CAMERA REMO. CON. (B) C.B.A.
VEPW0195
P705
BACKUP
P706
FADE SW
CN002 (VEKW 0580)
FRONT CIRCUIT C.B.A.
VEPW0194
CN003 (VEKW0588)
CN803 (VEKW0585)
POWER ZOOM (A) C.B.A.
VEPW0199
ZOOM SW
ZOOM MOTOR
CN804 (VEKW0556)
POWER ZOOM (B) C.B.A.
VEPW0119
M
CN801 (VEKW0581)
CN802 (VEKW0582)
DATA WRITE
EXT TIMER
EXT RUN
EXT STBY
INT (H)
INF (H)
REC/REV
BACK UP
CAMERA REMO. CON. (A) C.B.A.
VEPW0196
CN703 (VEKW0587)
CONNECTOR
CN704 (VEKW0593)
P703
V SYNC
H SYNC
EXT STANDBY
CN708 (VEKW0635)
OPTION SOCKET
(VEKW0586) CN001
P704
TALLY
REC/REV C.B.A.
VEPW0212
TALLY SW C.B.A.
VEPW0111
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ORDER NO. VRD-8303-372

Service Manual

Color Video Camera
PK-957
Power Supply Unit
PK-A789S

Vol. 5

Exploded Views
Replacement Parts List

Newvicon
Panasonic

PK-957

Panasonic
Power Supply

PK-A789S

SPECIFICATIONS:

Power Source:	DC 12V ± 10% AC 120V ± 10%, 60Hz ± 0.5% (with Power Supply Unit)
Power Consumption: (with E.V.F)	DC 6.6W at 12V DC (Battery) DC 2.0W at standby
Newvicon Tube System:	2/3″ frequency separation single tube system (built-in stripe filter)
Single Carrier Frequency:	5MHz
Focus System:	Electro-static type
Lens Mounting:	Built-in zoom lens (not “C” mount)
Lens:	8:1 zoom lens with auto/manual iris control. Auto zoom lens and macro construction F: 1.6, f: 12—96mm d: 1.2m to infinity
Lens Diameter:	58mm
Light Sensitivity:	Minimum light intensity on optical image: 10 Lux (F: 1.4) Optimum light intensity on optical image: 900 Lux
Video Output Level:	1.0Vp-p, 75Ω (M type coaxial connector) (Standard NTSC signal)
Sync. System:	Internal Sync.: RS-170
Signal to Noise Ratio:	More than 45dB
Horizontal Resolution:	300 lines

Color Temperature Control:	2 step switch (indoor/outdoor) & auto adjust
Microphone:	Built-in stereo microphone
Audio Output Level:	−20dB, Hi-impedance
Audio Output Impedance:	High impedance (1KΩ)
External Microphone Input Impedance: (Left, Right)	600Ω unbalanced
Electronic Viewfinder:	Monochrome 1 inch CRT
Operating Temperature:	5°C to 40°C
Operating Humidity:	10% to 75%
Operating Position:	Normal position only
Weight:	Camera Head with E.V.F. 5.5 lbs (with lens, 7ft cable & shoulder pad/handle grip) AC adaptor (option) 2.4 lbs
Dimensions:	Camera Head with E.V.F. 8.3″(W) × 8.7″(H) × 11.8″(D) 208mm(W) × 218mm(H) × 296mm(D) AC adaptor (option) 3″(W) × 3″(H) × 6″(D) 79mm(W) × 75mm(H) × 149mm(D)

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

Panasonic

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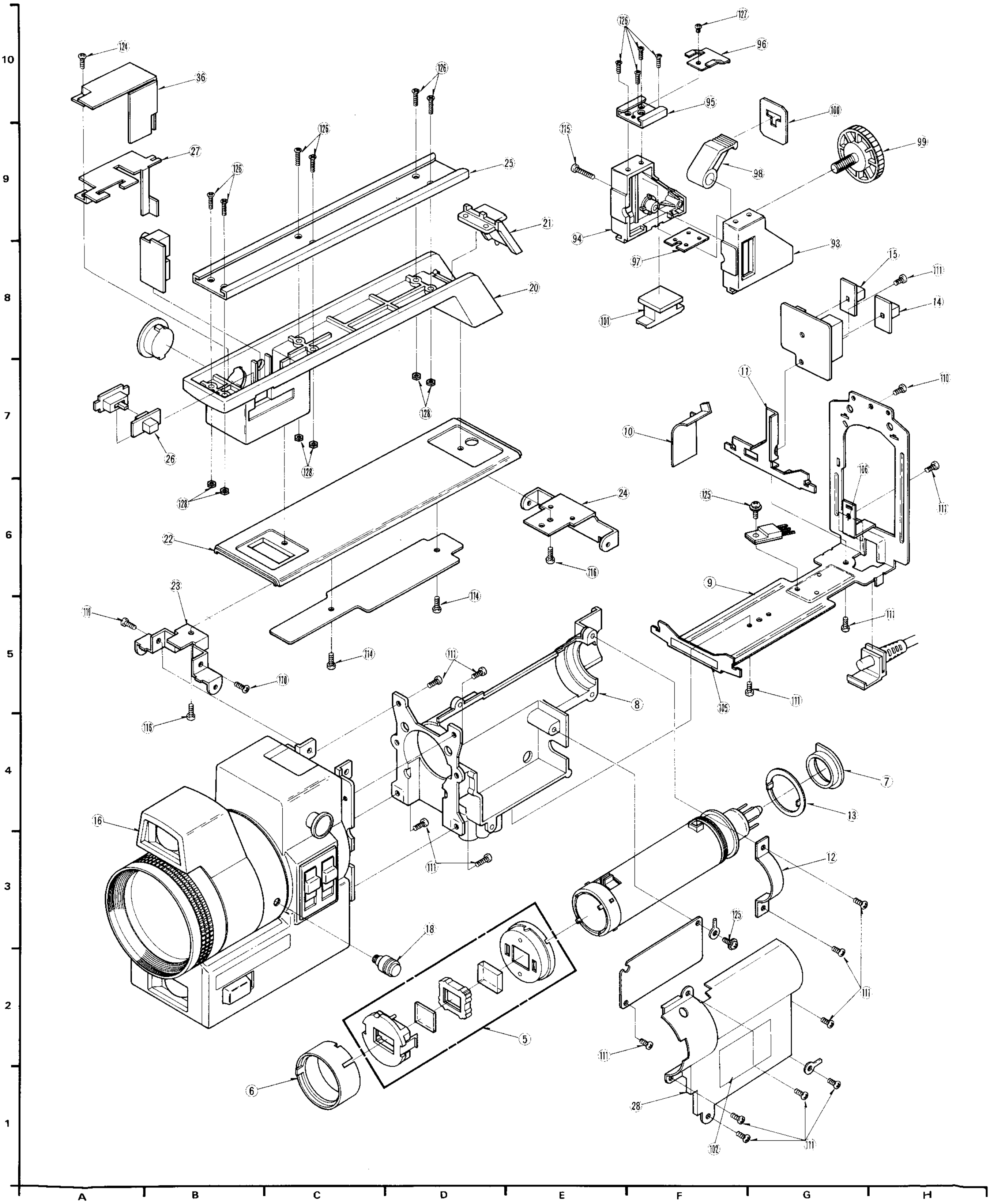
EXPLODED VIEW ❶ *Camera Unit Section*



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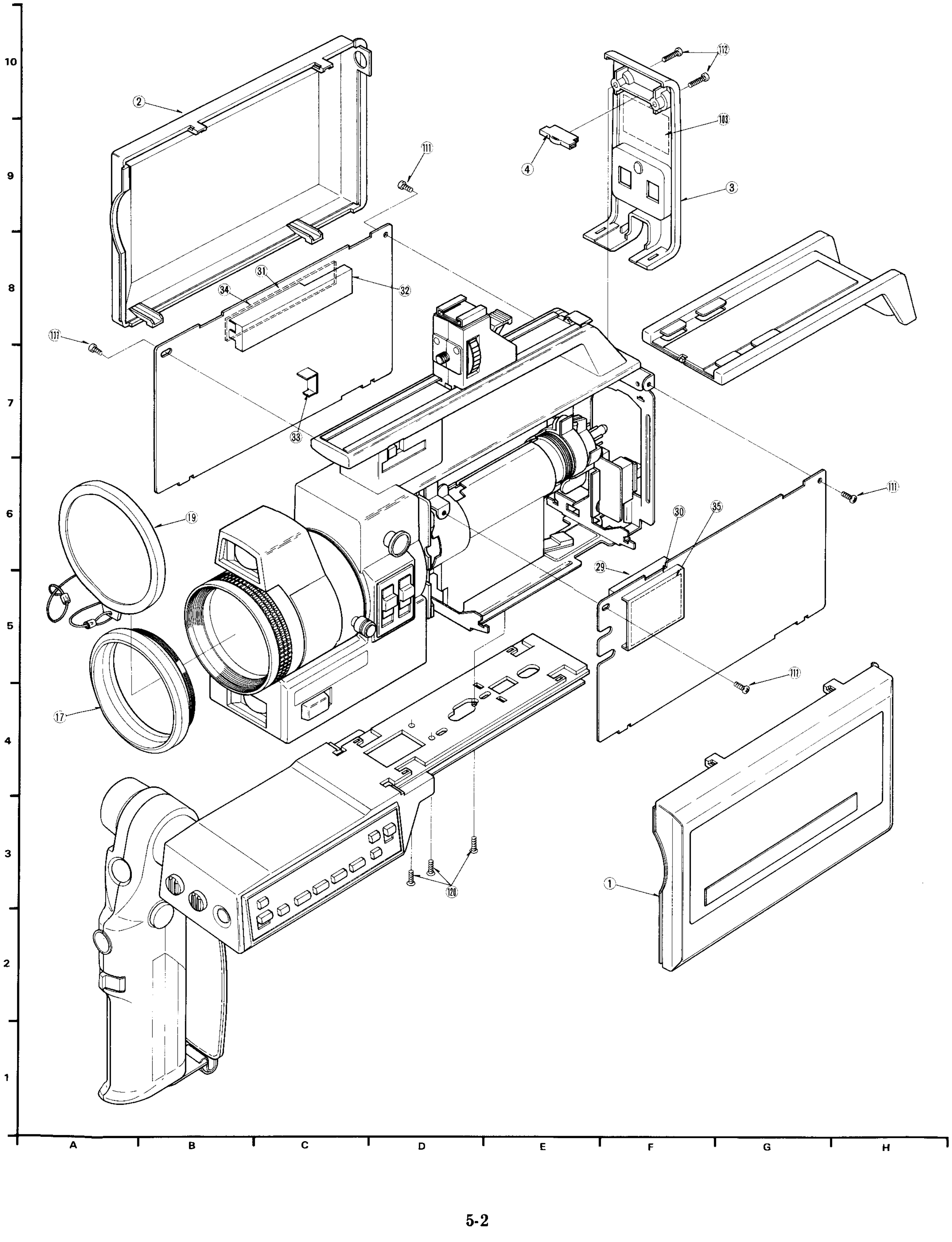
❷ *Camera Unit Casing Parts Section*



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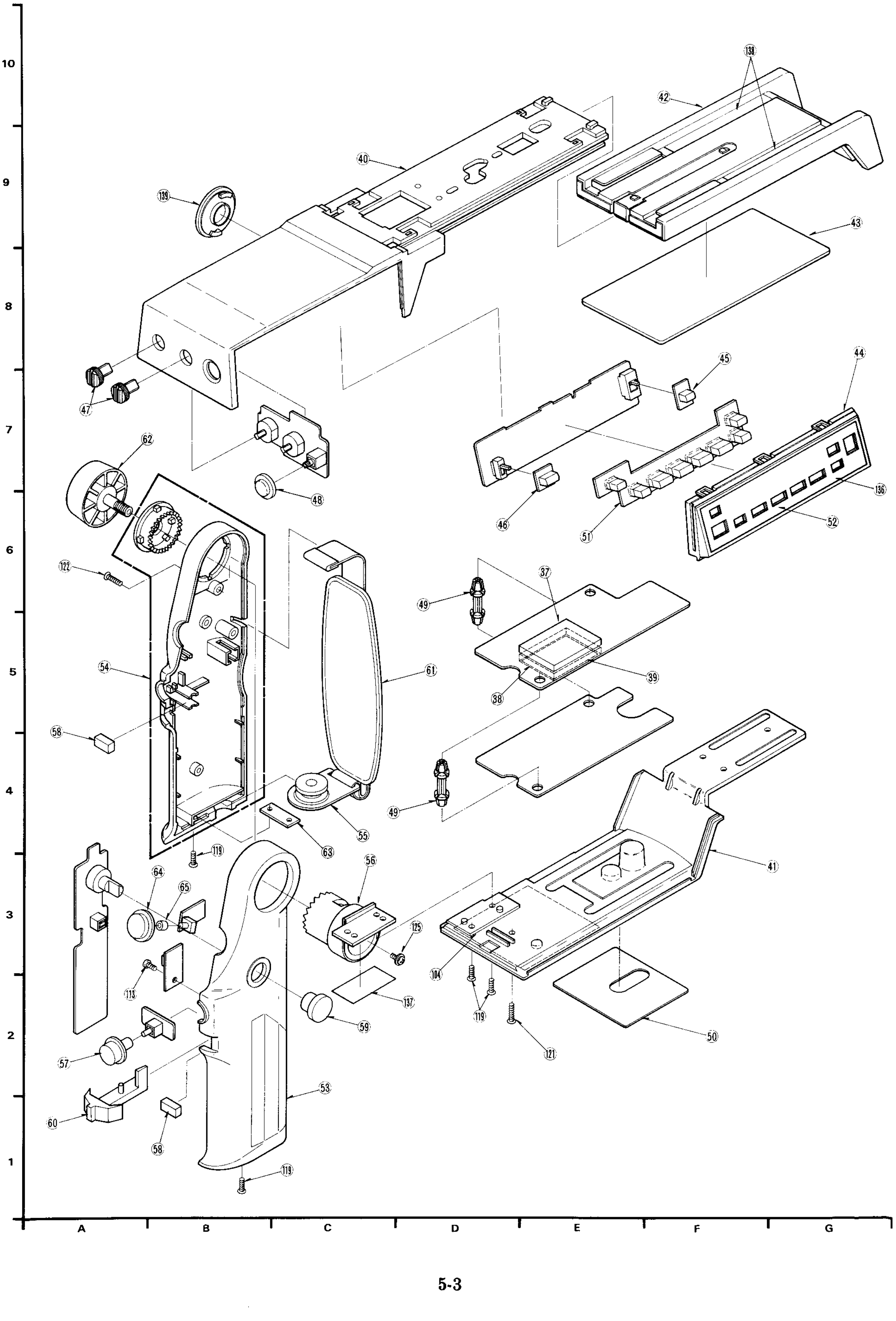
❸ *Remote Control Shoulder Unit Section*



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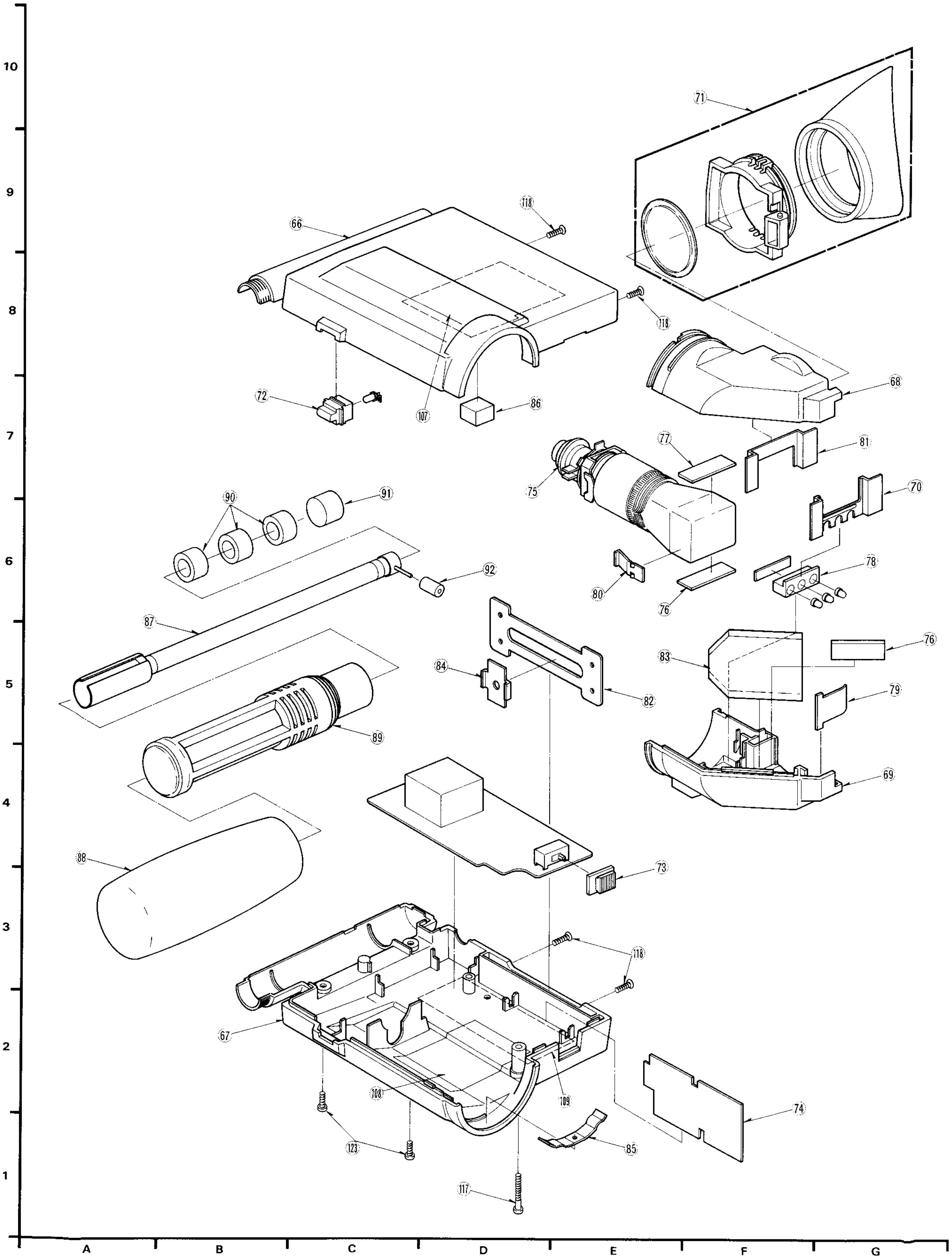
❹ *Electronic Viewfinder Section*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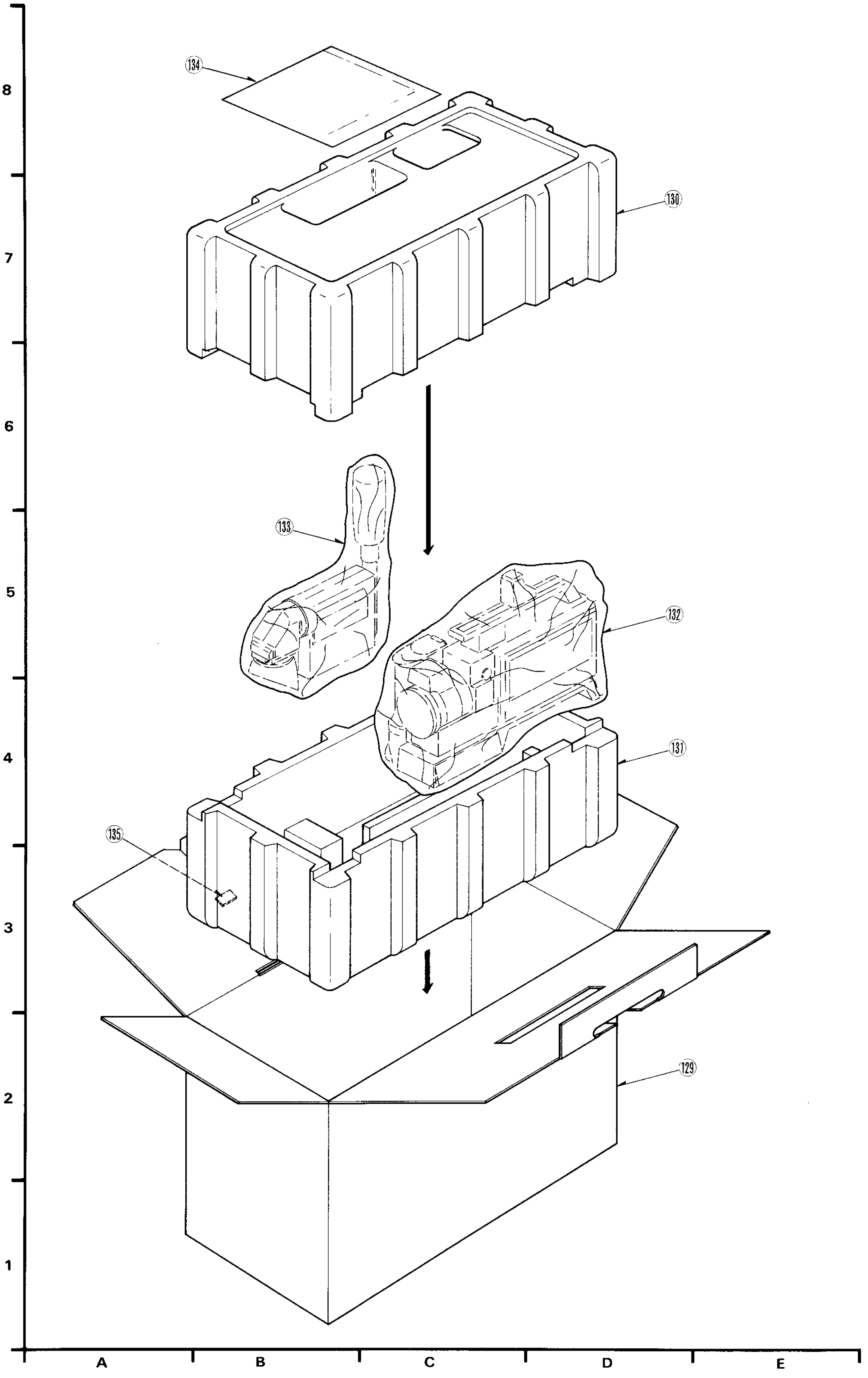
❺ *Packing Parts Section*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Mechanical Replacement Parts List

Note: *Be sure to make your orders of replacement parts according to this list.
○ . . . . Available replacement part
X . . . . Not available as replacement
☐ . . . . Only available on special order

Item No.	Drawing No.	Description	Pcs/ Set	Availa-bility	Part No.	Remark
		CSU				
1	2	RIGHT SIDE COVER ASS'Y	1	o	VYKW0407	
2	2	LEFT SIDE COVER ASS'Y	1	o	VYKW0409	
3	2	BACK COVER ASS'Y	1	o	VYKW0427	
4	2	BARRIER FIXING ANGLE	1	o	VMBW0025	
5	1	FILTER FIXTURE ASS'Y	1	o	VXEW0018	
6	1	FILTER RING	1	o	VMDW0028	
7	1	N.V BIAS LIGHT HOLDER	1	o	VMDW0042	
8	1	MAIN CHASSIS	1	o	VMKW0025	
9	1	SUB CHASSIS	1	o	VMAW0090-1	
10	1	SUB CHASSIS ANGLE	1	o	VMAW0101	
11	1	PRINT ANGLE	1	o	VMAW0093	
12	1	DY BAND	1	o	VMAW0098-1	
13	1	DY SPRING	1	o	VMBW0023-1	
14	1	STANDBY SW KNOB	1	o	VGTW0042	
15	1	NEGA/POSI SW KNOB	1	o	VGTW0043	
16	1	X8 AUTO FOCUS POWER ZOOM	1	o	VFLW0052	
		LENS				
17	2	LENS HOOD	1	o	VKUW0039	
18	1	LENS LEVER	1	o	VMLW0015	
19	2	HOOD CAP ASS'Y	1	o	VXJW0006	
20	1	HANDLE	1	o	VKHW0046	
21	1	HANDLE COVER	1	o	VKHW0036	
22	1	TOP COVER	1	o	VKGW0235	
23	1	HANDLE ANGLE (FRONT)	1	o	VMAW0091	
24	1	HANDLE ANGLE (REAR)	1	o	VMAW0092	
25	1	ACCESSORIES SHOE	1	o	VGQW0017	
26	1	S/M SELECTOR KNOB	1	o	VGTW0070	
27	1	JACK FIXING ANGLE	1	o	VMAW0157	
		CASE				
28	1	PRE-AMP SHIELD COVER	1	o	VSCW0093	
29	2	AVR SHIELD CASE (A)	1	o	VSCW0083	
30	2	AVR SHIELD CASE (B)	1	o	VSCW0084	
31	2	14MHz CCD SHIELD CASE (A)	1	o	VSCW0088	
32	2	14MHz CCD SHIELD CASE (B)	1	o	VSCW0089	
33	2	DL SHIELD PLATE	1	o	VSCW0085	
34	2	14MHz CCD BARRIER	1	o	VMZW0085	
35	2	AVR BARRIER	1	o	VMZW0086	
36	1	HANDLE SHIELD COVER	1	o	VSCW0075	
37	3	REMO. CON. SHIELD CASE (A)	1	o	VSCW0086	
38	3	REMO. CON. SHIELD CASE (B)	1	o	VSCW0087	
39	3	REMO. CON. INSULATION	1	o	VMZW0087	
		SHEET				
		REMO. CON. SHOULDER				
40	3	REMO. CON. CASE ASS'Y	1	o	VYKW0460	
41	3	REMO. CON. CHASSIS	1	o	VMKW0037	
42	3	SHOULDER SLIDE	1	o	VKGW0327	
43	3	SHOULDER PAD	1	o	VMFW0029	
44	3	REMO. CON. PANEL CASE	1	o	VKGW0363	
45	3	SLIDE BUTTON (A)	1	o	VGTW0066	
46	3	SLIDE BUTTON (B)	1	o	VGTW0067	
47	3	R/B KNOB	2	o	VGTW0068	
48	3	FADE BUTTON	1	o	VGTW0065	
49	3	P.C.B. FIXING PIECE	2	o	VKBW0006	
(139)	3	REMO. CON. CAP ASS'Y	1	o	VXFW0011	
50	3	REMO. CON. BOTTOM SHEET	1	o	VKNW0017	
51	3	REMO. CON. RUBBER SWITCH	1	o	VMGW0038	
52	3	REMO. CON. PANEL	1	o	VGPW0224	
(136)	3	REMO. CON. PLATE	1	o	VSCW0098	
		GRIP				
53	3	RIGHT SHOULDER GRIP	1	o	VKHW0037-1	
54	3	LEFT SHOULDER GRIP ASS'Y	1	o	VYHW0045-1	
55	3	STRAP HOLDER	1	o	VKGW0356	
56	3	CRUTCH (A)	1	o	VMVW0005	
57	3	PUSH BUTTON	1	o	VGTW0084	
58	3	POWER ZOOM SPONGE	2	o	VMFW0021	
59	3	VOLUME KNOB	1	o	VGTW0040	
60	3	POWER ZOOM BUTTON	1	o	VGTW0038	
61	3	HAND STRAP	1	o	VFBW0007	
62	3	LOCK KNOB	1	o	VGTW0039	
63	3	GRIP CASE FIXING ANGLE	1	o	VMAW0159	
64	3	REC REVIEW BUTTON	1	o	VGTW0077	
65	3	REC REVIEW SPONGE	1	o	VMFW0031	
(137)	3	REMO. CON. BARRIER	1	o	VMZW0094	
		SIDE EVF				
66	4	EVF TOP COVER (II)	1	o	VKGW0226	
67	4	EVF BOTTOM COVER (II)	1	o	VKGW0227-1	
68	4	CRT COVER (A)	1	o	VKGW0228	
69	4	CRT COVER (B)	1	o	VKGW0229	
70	4	CRT PROTECTION COVER (B)	1	o	VXAW0029	
		ASS'Y				
71	4	EVF DOOR ASS'Y	1	o	VYKW0225	
72	4	TALLY DIFFUSION PIECE	1	o	VGQW0009	
73	4	R/L CHANGE KNOB	1	o	VGTW0044	
74	4	EVF BARRIER	1	o	VMZW0066	
75	4	CRT FIXING BUSH	1	o	VMGW0016	
76	4	EVF CRT CUSHION (II)	2	o	VMGW0031	
77	4	EVF CRT CUSHION (III)	1	o	VMGW0032	
78	4	LED SPACER (II)	1	o	VMXW0051	
79	4	EVF SPRING (II)	1	o	VMBW0028	
80	4	GROUND SPRING	1	o	VMAW0051	
81	4	CRT PROTECTION COVER (A)	1	o	VMAW0142	
82	4	CASE FIXING ANGLE (A)	1	o	VMAW0103	
83	4	EVF MIRROR	1	o	VMRW0002	
84	4	EVF MOVEABLE ANGLE	1	o	VMAW0094	
85	4	EVF ROTATION SPRING	1	o	VMBW0027	
86	4	EVF CUSHION	1	o	VMGW0030	
87	4	MIC ASS'Y	1	o	VXMW0028	
88	4	MIC COVER	1	o	VGFW0011	
89	4	MIC CASE ASS'Y	1	o	VYKW0437	
90	4	MIC SPONGE (A)	3	o	VMFW0032	
91	4	MIC SPONGE (B)	1	o	VMFW0033	
92	4	MIC SPONGE (C)	1	o	VMFW0034	
93	1	EVF HOLDING CASE (R3)	1	o	VKGW0257-2	
94	1	EVF HOLDING CASE (L3)	1	o	VKGW0258-2	
95	1	SHOE	1	o	VMAW0156	
96	1	SHOE PRESSING SPRING	1	o	VMBW0031	
97	1	SHOE FIXING ANGLE	1	o	VMAW0107	
98	1	EVF FIXING LEVER	1	o	VMLW0012	
99	1	EVF KNOB	1	o	VGTW0033	
100	1	EVF HOLDING CASE SPACER	1	o	VMXW0049	
101	1	EVF FIXING PIECE	1	o	VMXW0048	
		LABEL				
102	1	CAUTION LABEL	1	o	VQLW0386	
103	2	CAUTION LABEL (C)	1	o	VQLW0468	
104	3	CAUTION LABEL (D)	1	o	VQLW0476	
105	1	CHASSIS LABEL	1	o	VQLW0073	
106	1	TARGET INDICATION LABEL	1	o	VQLW0335	
107	4	WARNING LABEL	1	o	VQLW0324-1	
108	4	HIGH VOLTAGE CAUTION LABEL	1	o	VQLW0323-1	
109	4	EVF CAUTION LABEL	1	o	VQLW0486	
(138)	3	SHOULDER SEAL	2	o	VQLW0561	
		SCREW				
		BINDING HEAD MACHINE				
110	1	SCREWS 3ϕx4mm	3	o	XSB3+4FJ	
111	1,2	3ϕx6mm	20	o	XSB3+6FJ	
112	2	3ϕx10mm	2	o	XSB3+10KK	
		BINDING HEAD TAPPING				
113	3	SCREWS 3ϕx5mm	1	o	XTB3+5GJ	
114	1	3ϕx6mm	2	o	XTB3+6GJ	

Item No.	Drawing No.	Description	Pcs/ Set	Availa-bility	Part No.	Remark
115	1	3⌀x16mm	1	o	XTB3+16GFXK	
116	1	3⌀x12mm	2	o	XTB3+12GFU	
117	4	3⌀x25mm	1	o	XTB3+25GFXK	
		FLUSH HEAD MACHINE SCREWS				
118	4	2.6⌀x5mm	4	o	XSS26+5FXK	
119	3	3⌀x6mm	4	o	XSS3+6FXK	
120	2	3⌀x10mm	3	o	XSS3+10FXK	
		FLUSH HEAD TAPPING SCREWS				
121	3	3⌀x12mm	1	o	XTS3+12GFXK	
122	3	3⌀x20mm	1	o	XTS3+20GFXK	
		PAN HEAD TAPPING SCREWS				
123	4	2.6⌀x6mm	2	o	XTN26+6GFXK	
124	1	2.6⌀x10mm	1	o	XTN26+10GFU	
		PAN HEAD WITH WASHER ASS'Y				
125	1,3	3⌀x8mm	2	o	XYN3+F8FU	
		PRECISION MINI-SCREWS				
126	1	2⌀x5mm	10	o	XQS2+A5FXK	
		PAN HEAD PRECISION MINI-				
127	1	SCREWS 2⌀x1.5mm	1	o	XQN2+A15FYW	
128	1	HEX. HEADS NUTS 2⌀	6	o	XNF2JFXK	
		PACKING CASE				
129	5	PACKING CASE	1	o	VPKW0316	
130	5	CUSHION TOP	1	o	VPGW0087	
131	5	CUSHION BOTTOM	1	o	VPGW0086	
132	5	POLY BAG FOR CAMERA HEAD	1	o	XZB29X70A02	
133	5	POLY BAG FOR EVF	1	o	XZB29X33A02	
134	5	FAN BAG KIT	1	o	VQFW0120	
135	5	HANDLE	1	o	VPQW0004	
136	3	REMO. CON. PLATE	1	o	VSCW0098	
137	3	REMO. CON. BARRIER	1	o	VMZW0094	
138	3	SHOULDER SEAL	2	o	VQLW0561	
139	3	REMO. CON. CAP ASS'Y	1	o	VXFW0011	

Electrical Replacement Parts List

Note:
1. Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
   Components identified by shade have special characteristics important for safety. When replacing any of these components, use only the original ones.
3. Unless otherwise specified;
   All resistors are in OHMS (Ω), 1/8w, ±5% carbon, K=1,000Ω, M=1,000KΩ.
   All capacitors are in MICROFARADS (μF), ±10% P=μμF.
   All coils are in MICROHENRIES (μH), m=10₃μ.
4. C.B.A: Circuit Board Assembly.
5. C.B: Circuit Board.

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
	VEPW0187	PRE-AMP C.B.A.	1	
	VEPW0188	PROCESS C.B.A.	1	
	VEPW0189	DEFLECTION C.B.A.	1	
	VEPW0211	NEGA/POSI PRINT C.B.A.	1	
	VEPW0109B	SOCKET C.B.A.	1	
	VEPW0193	REAR SIDE C.B.A.	1	
	VEPW0212	REC/REV C.B.A.	1	
	VEPW0199	POWER ZOOM (A) C.B.A.	1	
	VEPW0119	POWER ZOOM (B) C.B.A.	1	
	VEPW0194	FRONT CIRCUIT C.B.A.	1	
	VEPW0190	STEREO C.B.A.	1	
	VEPW0191	STEREO JACK C.B.A.	1	
	VEPW0192	STE/MONO SELECT SW C.B.A.	1	
	VEPW0196	CAMERA REMO. CON. (A) C.B.A.	1	
	VEPW0195	CAMERA REMO. CON. (B) C.B.A.	1	
	VEPW0197	CAMERA REMO. CON. (SW) C.B.A.	1	
	VEPW0111	TALLY SW C.B.A.	1	
	VEPW0198	E.V.F. PRINT C.B.A.	1	
	VEPW0123B	E.V.F. LED C.B.A.	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Pre-Amp C.B.A.		
			Transistors		
Q201		2SK321(Q)		1	
Q202		2SA1022(B)		1	
Q203		2SC2404(C)		1	
Q204,205		2SA1022(B)		2	
Q206		2SD601(R)		1	
			Diode		
D201		MA27A		1	
			Resistors		
R201		ERJ8GCSJ511	Chip 510	1	
R202		ERJ8GCSJ682	Chip 6.8K	1	
R203		ERJ8GCSJ102	Chip 1K	1	
R204		ERJ8GCSJ222	Chip 2.2K	1	
R205		ERJ8GCSJ121	Chip 120	1	
R206		ERJ8GCSJ161	Chip 160	1	
R207		ERD25TJ565	5.6M	1	
R208		ERJ8GCSJ104	Chip 100K	1	
R209		ERO50CKF2704	2.7M	1	
R210		ERJ8GCSJ181	Chip 180	1	
R211		ERJ8GCSJ152	Chip 1.5K	1	
R212		ERJ8GCSJ273	Chip 27K	1	
R213		ERJ8GCSJ104	Chip 100K	1	
R214		ERJ8GCSJ122	Chip 1.2K	1	
R215		ERJ8GCSJ682	Chip 6.8K	1	
R216		ERJ8GCSJ623	Chip 62K	1	
R217		ERJ8GCSJ222	Chip 2.2K	1	
R218		ERJ8GCSJ750	Chip 75	1	
			Capacitors		
C201		VCAMX100V223K	Mylar 100V 0.022	1	
C202		ECEA1AF470	Electrolytic 10V 47	1	
C203		ECEA1AK470	Electrolytic 10V 47	1	
C204		ECQE1104KN	Mylar 100V 0.1	1	
C205		ECSF0JE106	Tantalum 6.3V 10	1	
C206		ECEA1AS470	Electrolytic 10V 47	1	
C207		NCUV1E104ZFM	Chip Ceramic 25V 0.1	1	
C208		ECEA1VSS4R7	Electrolytic 35V 4.7	1	
C209		ECCW1H040CC5	Ceramic 50V 3P	1	
C210		ECU-V1H150KCM	Chip Ceramic 50V 15P	1	
C211		ECV-1ZW40X53N	Trimmer 40P	1	
			Coils		
L201		ELT12R012	210μH	1	
L202		EL0405SKI-101K	100μH	1	
			Miscellaneous		
CN201		VEKW0331	2P Connector Ass'y	1	
CN202		VEKW0583	3P Connector Ass'y	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Process C.B.A.		
			Integrated Circuit		
IC301		AN2133		1	
IC302		AN2141		1	
IC303		AN2241		1	
IC304		AN2331		1	
IC305		MN6064		1	
IC306		AN2431		1	
IC307		MN8036		1	
IC309		MN6171		1	
IC310		AN6914		1	
IC311		AN2340		1	
IC312		AN2341		1	
			Transistors		
Q301		2SD601(Q,R)		1	
Q302		2SB709(Q,R)		1	
Q303		2SB641(Q,R)		1	
Q304-306		2SA838		3	
Q307,308		2SD636(Q,R)		2	
Q309		2SC2206		1	
Q310		2SB709(Q,R)		1	
Q311		2SD601(Q,R)		1	
Q312,313		2SD636(Q,R)		2	
Q314-316		2SD601(Q,R)		3	
Q317		2SB709(Q,R)		1	
Q318-320		2SD636(Q,R)		3	
Q322,323		2SD601(Q,R)		2	
Q324		2SC2206		1	
Q325		2SA838		1	
Q327		2SC2377		1	
Q328-331		2SD636(Q,R)		4	
Q333-336		2SB641(Q,R)		4	
Q337		2SB709(Q,R)		1	
Q338-341		2SD601(Q,R)		4	
Q342		2SB709(Q,R)		1	
Q354,355		2SD636(Q,R)		2	
Q357,358		2SD636(Q,R)		2	
Q359,360		2SB641(Q,R)		2	
Q361,362		2SD636(Q,R)		2	
Q363		2SB709(Q,R)		1	
			Diodes		
D301		MA27WA		1	
D302		MA151K	Chip	1	
D303,304		MA165		2	
D305		MA151K	Chip	1	
D306-308		MA165		3	
D310		MA27A		1	
D311		MA165		1	
D312,313		OA90A-R		2	
D314		MA165		1	
D317		MZ303A		1	
D319,320		MA165		2	
			Resistors		
R301		ERJ8GCSJ472	Chip 4.7K	1	
R302		ERJ8GCSJ563	Chip 56K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R303		ERJ8GCSJ102	Chip 1K	1	
R304		ERJ8GCSJ472	Chip 4.7K	1	
R306		ERJ8GCSJ563	Chip 56K	1	
R307		ERJ8GCSJ821	Chip 820	1	
R308		ERJ8GCSJ152	Chip 1.5K	1	
R309		ERJ8GCSJ332	Chip 3.3K	1	
R310		ERJ8GCSJ563	Chip 56K	1	
R311		ERJ8GCSJ391	Chip 390	1	
R312		ERTD2FHJ332S	Thermistor 3.3K	1	
R313		ERJ8GCSJ102	Chip 1K	1	
R314		ERJ8GCSJ122	Chip 1.2K	1	
R315,316		ERJ8GCSJ272	Chip 2.7K	2	
R317		ERJ8GCSJ273	Chip 27K	1	
R318		ERJ8GCSJ104	Chip 100K	1	
R319		ERJ8GCSJ102	Chip 1K	1	
R320		ERJ8GCSJ152	Chip 1.5K	1	
R321		ERJ8GCSJ471	Chip 470	1	
R322		ERJ8GCSJ102	Chip 1K	1	
R323		ERJ8GCSJ104	Chip 100K	1	
R324		ERJ8GCSJ102	Chip 1K	1	
R325		ERJ8GCSJ471	Chip 470	1	
R326		ERJ8GCSJ681	Chip 680	1	
R327		ERJ8GCSJ392	Chip 3.9K	1	
R328		ERJ8GCSJ223	Chip 22K	1	
R329		ERJ8GCSJ471	Chip 470	1	
R330		ERJ8GCSJ152	Chip 1.5K	1	
R331		ERJ8GCSJ562	Chip 5.6K	1	
R332		ERJ8GCSJ272	Chip 2.7K	1	
R333		ERJ8GCSJ102	Chip 1K	1	
R334		ERJ8GCSJ563	Chip 56K	1	
R335		ERJ8GCSJ821	Chip 820	1	
R336		ERJ8GCSJ153	Chip 15K	1	
R337		ERJ8GCSJ561	Chip 560	1	
R338,339		ERJ8GCSJ472	Chip 4.7K	2	
R340		ERJ8GCSJ102	Chip 1K	1	
R341		ERJ8GCSJ103	Chip 10K	1	
R342		ERJ8GCSJ332	Chip 3.3K	1	
R343		ERJ8GCSJ102	Chip 1K	1	
R344,345		ERJ8GCSJ472	Chip 4.7K	2	
R346		ERJ8GCSJ822	Chip 8.2K	1	
R347		ERJ8GCSJ153	Chip 15K	1	
R348		ERJ8GCSJ152	Chip 1.5K	1	
R349		ERJ8GCSJ222	Chip 2.2K	1	
R350		ERJ8GCSJ562	Chip 5.6K	1	
R351		ERJ8GCSJ333	Chip 33K	1	
R352		ERJ8GCSJ331	Chip 330	1	
R353		ERJ8GCSJ473	Chip 47K	1	
R354		ERJ8GCSJ821	Chip 820	1	
R355		ERJ8GCSJ472	Chip 4.7K	1	
R356		ERJ8GCSJ563	Chip 56K	1	
R357		ERJ8GCSJ333	Chip 33K	1	
R358		ERJ8GCSJ561	Chip 560	1	
R359		ERJ8GCSJ392	Chip 3.9K	1	
R360		ERJ8GCSJ273	Chip 27K	1	
R361		ERJ8GCSJ103	Chip 10K	1	
R362		ERJ8GCSJ102	Chip 1K	1	
R363		ERJ8GCSJ562	Chip 5.6K	1	
R364-368		ERJ8GCSJ103	Chip 10K	5	
R369,370		ERJ8GCSJ152	Chip 1.5K	2	
R371		ERD25TJ565	5.6M	1	
R372-374		ERJ8GCSJ153	Chip 15K	3	
R375		ERJ8GCSJ473	Chip 47K	1	
R376-378		ERJ8GCSJ153	Chip 15K	3	
R379		ERJ8GCSJ473	Chip 47K	1	
R380		ERJ8GCSJ472	Chip 4.7K	1	
R381		ERJ8GCSJ223	Chip 22K	1	
R382		ERJ8GCSJ472	Chip 4.7K	1	
R383		ERJ8GCSJ224	Chip 220K	1	
R384		ERJ8GCSJ103	Chip 10K	1	
R385-387		ERJ8GCSJ562	Chip 5.6K	3	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R388,389		ERJ8GCSJ822	Chip 8.2K	2	
R390		ERJ8GCSJ392	Chip 3.9K	1	
R391		ERJ8GCSJ182	Chip 1.8K	1	
R392		ERJ8GCSJ433	Chip 43K	1	
R398		ERJ8GCSJ682	Chip 6.8K	1	
R399		ERJ8GCSJ561	Chip 560	1	
R3100		ERJ8GCSJ102	Chip 1K	1	
R3101		ERJ8GCSJ271	Chip 270	1	
R3102		ERJ8GCSJ222	Chip 2.2K	1	
R3103		ERJ8GCSJ102	Chip 1K	1	
R3104		ERJ8GCSJ271	Chip 270	1	
R3105		ERJ8GCSJ122	Chip 1.2K	1	
R3106		ERJ8GCSJ561	Chip 560	1	
R3109		ERJ8GCSJ222	Chip 2.2K	1	
R3110		ERJ8GCSJ122	Chip 1.2K	1	
R3111		ERJ8GCSJ561	Chip 560	1	
R3112		ERJ8GCSJ752	Chip 7.5K	1	
R3113		ERJ8GCSJ163	Chip 16K	1	
R3114		ERJ8GCSJ472	Chip 4.7K	1	
R3115		ERJ8GCSJ561	Chip 560	1	
R3116		ERJ8GCSG362	Chip 3.6K	1	
R3117		ERJ8GCSG622	Chip 6.2K	1	
R3118		ERJ8GCSJ223	Chip 22K	1	
R3119		ERJ8GCSJ183	Chip 18K	1	
R3120		ERJ8GCSJ152	Chip 1.5K	1	
R3121		ERJ8GCSJ272	Chip 2.7K	1	
R3122		ERJ8GCSJ562	Chip 5.6K	1	
R3123,3124		ERJ8GCSJ102	Chip 1K	2	
R3125		ERJ8GCSJ332	Chip 3.3K	1	
R3126		ERJ8GCSJ822	Chip 8.2K	1	
R3127		ERJ8GCSJ272	Chip 2.7K	1	
R3128		ERJ8GCSJ222	Chip 2.2K	1	
R3129		ERJ8GCSJ103	Chip 10K	1	
R3130		ERJ8GCSJ183	Chip 18K	1	
R3131		ERJ8GCSJ223	Chip 22K	1	
R3132		ERJ8GCSJ333	Chip 33K	1	
R3133,3134		ERJ8GCSJ154	Chip 150K	2	
R3135		ERJ8GCSJ102	Chip 1K	1	
R3136		ERJ8GCSJ272	Chip 2.7K	1	
R3141		ERJ8GCSJ391	Chip 390	1	
R3142,3143		ERJ8GCSJ682	Chip 6.8K	2	
R3144		ERJ8GCSJ222	Chip 2.2K	1	
R3145		ERJ8GCSJ332	Chip 3.3K	1	
R3146		ERJ8GCSJ393	Chip 39K	1	
R3147		ERJ8GCSJ472	Chip 4.7K	1	
R3148		ERJ8GCSJ681	Chip 680	1	
R3149		ERJ8GCSJ102	Chip 1K	1	
R3150		ERJ8GCSJ103	Chip 10K	1	
R3151		ERJ8GCSJ331	Chip 330	1	
R3152		ERJ8GCSJ183	Chip 18K	1	
R3157		ERJ8GCSJ103	Chip 10K	1	
R3158		ERJ8GCSJ102	Chip 1K	1	
R3159		ERJ8GCSJ393	Chip 39K	1	
R3160		ERJ8GCSJ273	Chip 27K	1	
R3161,3162		ERJ8GCSJ223	Chip 22K	2	
R3163,3164		ERJ8GCSJ104	Chip 100K	2	
R3165		ERJ8GCSJ154	Chip 150K	1	
R3169		ERJ8GCSJ154	Chip 150K	1	
R3170		ERJ8GCSJ472	Chip 4.7K	1	
R3171		ERJ8GCSJ562	Chip 5.6K	1	
R3172,3173		ERJ8GCSJ472	Chip 4.7K	2	
R3174		ERJ8GCSJ562	Chip 5.6K	1	
R3175		ERJ8GCSJ472	Chip 4.7K	1	
R3176		ERJ8GCSJ393	Chip 39K	1	
R3177		ERJ8GCSJ562	Chip 5.6K	1	
R3178		ERJ8GCSJ124	Chip 120K	1	
R3179		ERJ8GCSJ333	Chip 33K	1	
R3180		ERJ8GCSJ222	Chip 2.2K	1	
R3181		ERJ8GCSJ102	Chip 1K	1	
R3184		ERJ8GCSJ332	Chip 3.3K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R3185		ERJ8GCSJ472	Chip 4.7K	1	
R3186		ERJ8GCSJ104	Chip 100K	1	
R3187		ERJ8GCSJ472	Chip 4.7K	1	
R3188		ERJ8GCSJ103	Chip 10K	1	
R3189		ERJ8GCSJ222	Chip 2.2K	1	
R3190		ERJ8GCSJ102	Chip 1K	1	
R3193		ERJ8GCSJ563	Chip 56K	1	
R3211		ERJ8GCSJ103	Chip 10K	1	
R3212		ERJ8GCSJ272	Chip 2.7K	1	
R3213		ERJ8GCSJ560	Chip 56	1	
R3225		ERJ8GCSJ102	Chip 1K	1	
R3226,3227		ERJ8GCSJ105	Chip 1M	2	
R3228,3229		ERJ8GCSJ104	Chip 100K	2	
R3231		ERJ8GCSJ104	Chip 100K	1	
R3232		ERJ8GCSJ103	Chip 10K	1	
R3233		ERJ8GCSJ332	Chip 3.3K	1	
R3234		ERJ8GCSJ153	Chip 15K	1	
R3235		ERJ8GCSJ122	Chip 1.2K	1	
R3236		ERJ8GCSJ153	Chip 15K	1	
R3237		ERJ8GCSJ562	Chip 5.6K	1	
R3238		ERJ8GCSJ154	Chip 150K	1	
R3239		ERJ8GCSJ334	Chip 330K	1	
R3240		ERJ8GCSJ224	Chip 220K	1	
R3241		ERJ8GCSJ103	Chip 10K	1	
R3242		ERJ8GCSJ472	Chip 4.7K	1	
R3243,3244		ERJ8GCSJ473	Chip 47K	2	
R3245		ERJ8GCSJ103	Chip 10K	1	
R3268		ERJ8GCSJ181	Chip 180	1	
R3269		ERJ8GCSJ223	Chip 22K	1	
R3271-3274		ERDS2TJ154	150K	4	
			Variable Resistors		
VR301		EVN-1ACA00B34	30K	1	
VR302		EVN-1ACA00B15	100K	1	
VR303		EVN-1ACA00B13	1K	1	
VR304		EVN-1ACA00B14	10K	1	
VR305		EVN-1ACA00B52	500	1	
VR306		EVN-1ACA00B14	10K	1	
VR307		EVN-1ACA00B33	3K	1	
VR308		EVN-1ACA00B14	10K	1	
VR309		EVN-1ACA00B34	30K	1	
VR310		EVN-1ACA00B33	3K	1	
VR311-318		EVN-1ACA00B14	10K	8	
VR319		EVN-1ACA00B24	20K	1	
VR320		EVN-1ACA00B15	100K	1	
VR321		EVN-1ACA00B34	30K	1	
VR322,323		EVN-1ACA00B33	3K	2	
VR324		EVN-1ACA00B14	10K	1	
VR325		EVN-1ACA00B23	2K	1	
VR326		EVN-1ACA00B13	1K	1	
VR327,328		EVN-1ACA00B33	3K	2	
VR329		EVN-1ACA00B13	1K	1	
VR331,332		EVN-1ACA00B15	100K	2	
			Resistor Block		
RB301		EXB-H86261J	Resistor Ass'y	1	
			Capacitors		
C301		ECEA0JK470	Electrolytic 6.3V 47	1	
C302		ECEA1AF470	Electrolytic 10V 47	1	
C303		ECU-V1H103KBM	Chip Ceramic 50V 0.01	1	
C304		ECSF1AE106	Tantalum 10V 10	1	
C305		ECEA0JK470	Electrolytic 6.3V 47	1	
C306		NCUV1E104ZFM	Chip Ceramic 25V 0.1	1	
C307		ECSF1CD104	Tantalum 16V 0.1	1	
C308		ECU-V1H680KCM	Chip Ceramic 50V 68P	1	
C309		ECEA1HK010	Electrolytic 50V 1	1	
C310		ECEA1HN3R3S	Electrolytic 50V 3.3	1	
C311		ECSF1CE105	Tantalum 16V 1	1	
C312		ECSF1CD684	Tantalum 16V 0.68	1	
C313		ECSF1CD104	Tantalum 16V 0.1	1	
C314		ECU-V1H220KCM	Chip Ceramic 50V 22P	1	
C315		ECU-V1H101KM	Chip Ceramic 50V 100P	1	
C316		ECU-V1H470KCM	Chip Ceramic 50V 47P	1	
C317		ECU-V1H270KCM	Chip Ceramic 50V 27P	1	
C318		ECU-V1H151KCM	Chip Ceramic 50V 150P	1	
C319		ECU-V1H331KCM	Chip Ceramic 50V 330P	1	
C320,321		ECEA1CK100	Electrolytic 16V 10	2	
C322		ECU-V1H330KM	Chip Ceramic 50V 33P	1	
C323		ECU-V1H102KBM	Chip Ceramic 50V 1000P	1	
C324		ECU-V1H470KM	Chip Ceramic 50V 47P	1	
C325		ECU-V1H103KBM	Chip Ceramic 50V 0.01	1	
C326		ECU-V1H080FM	Chip Ceramic 50V 8P	1	
C327		ECU-V1H102KBM	Chip Ceramic 50V 1000P	1	
C328		ECEA1AF470	Electrolytic 10V 47	1	
C329,330		ECEA1CK100	Electrolytic 16V 10	2	
C331		ECU-V1H820KCM	Chip Ceramic 50V 82P	1	
C332		ECU-V1H331KM	Chip Ceramic 50V 330P	1	
C333		ECEA1HKNR47	Electrolytic 50V 0.47	1	
C334		ECU-V1H560KM	Chip Ceramic 50V 56P	1	
C335		ECU-V1H390KCM	Chip Ceramic 50V 39P	1	
C336		ECEA1CK100	Electrolytic 16V 10	1	
C337		NCUV1E104ZFM	Chip Ceramic 25V 0.1	1	
C338		ECEA1HKNR47	Electrolytic 50V 0.47	1	
C339		ECSF1CD474	Tantalum 16V 0.47	1	
C340		ECU-V1H101KCM	Chip Ceramic 50V 100P	1	
C341,342		ECEA1CK100	Electrolytic 16V 10	2	
C343		NCUV1E104ZFM	Chip Ceramic 25V 0.1	1	
C344		ECU-V1H820KCM	Chip Ceramic 50V 82P	1	
C345		ECU-V1H103KBM	Chip Ceramic 50V 0.01	1	
C346		ECSF1AE106	Tantalum 10V 10	1	
C347,348		NCUV1E104ZFM	Chip Ceramic 25V 0.1	2	
C349		ECU-V1H221KM	Chip Ceramic 50V 220P	1	
C350		ECU-V1H103KBM	Chip Ceramic 50V 0.01	1	
C351		ECU-V1H270KCM	Chip Ceramic 50V 27P	1	
C352		ECV-1ZW40X53N	Trimmer 1W 40P	1	
C353		ECU-V1H820KM	Chip Ceramic 50V 82P	1	
C354		ECEA1CK100	Electrolytic 16V 10	1	
C355		ECEA0JK470	Electrolytic 6.3V 47	1	
C356		NCUV1E104ZFM	Chip Ceramic 25V 0.1	1	
C357		ECU-V1H103KBM	Chip Ceramic 50V 0.01	1	
C358		ECU-V1H100DCM	Chip Ceramic 50V 10P	1	
C359,360		ECU-V1H103KBM	Chip Ceramic 50V 0.01	2	
C361		ECV-1ZW20X64	Trimmer 1W 20P	1	
C362		ECU-V1H103KBM	Chip Ceramic 50V 0.01	1	
C363		NCUV1E104ZFM	Chip Ceramic 25V 0.1	1	
C364		ECSF0JE106	Tantalum 6.3V 10	1	
C365,366		ECU-V1H103KBM	Chip Ceramic 50V 0.01	2	
C367		ECU-V1H680KCM	Chip Ceramic 50V 68P	1	
C368		ECU-V1H101KCM	Chip Ceramic 50V 100P	1	
C369		ECSF1AE476	Tantalum 10V 47	1	
C370		ECSF1AE106	Tantalum 10V 10	1	
C371		ECEA1CK100	Electrolytic 16V 10	1	
C372		ECEA0JK470	Electrolytic 6.3V 47	1	
C373		ECEA1CK100	Electrolytic 16V 10	1	
C374		ECU-V1H271KM	Chip Ceramic 50V 270P	1	
C375		ECSF1CD474	Tantalum 16V 0.47	1	
C376		ECEA1CK100	Electrolytic 16V 10	1	
C377,378		NCUV1E104ZFM	Chip Ceramic 25V 0.1	2	
C379,380		ECEA1HKNR47	Electrolytic 50V 0.47	2	
C381,382		ECEA1CK100	Electrolytic 16V 10	2	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
C388	ECU-V1H820KM	Chip Ceramic 50V 82P	1	
C389	ECEA1HK3R3	Electrolytic 50V 3.3	1	
C390,391	ECU-V1H222KBM	Chip Ceramic 50V 2200P	2	
C392	NCUV1E104ZFM	Chip Ceramic 25V 0.1	1	
C393	ECEA1AF470	Electrolytic 10V 47	1	
C394-398	ECEA1CK100	Electrolytic 16V 10	5	
C399	ECSF1CD474	Tantalum 16V 0.47	1	
C3100	ECU-V1H820KCM	Chip Ceramic 50V 82P	1	
C3101	ECSF1CD474	Tantalum 16V 0.47	1	
C3102-3105	ECEA1CK100	Electrolytic 16V 10	4	
C3106	ECU-V1H270KCM	Chip Ceramic 50V 27P	1	
C3107	ECEA1CK100	Electrolytic 16V 10	1	
C3108	ECU-V1H103KBM	Chip Ceramic 50V 0.01	1	
C3109,3110	ECSF1CD474	Tantalum 16V 0.47	2	
C3111	ECEA0JK470	Electrolytic 6.3V 47	1	
C3115	NCUV1E104ZFM	Chip Ceramic 25V 0.1	1	
C3120	ECEA1HK010	Electrolytic 50V 1	1	
C3121	ECU-V1H331KM	Chip Ceramic 50V 330P	1	
C3122	ECEA0JN471S	Electrolytic 6.3V 470	1	
C3125	ECEA1HK3R3	Electrolytic 50V 3.3	1	
C3126	ECEA1HKNR47	Electrolytic 50V 0.47	1	
C3134,3135	ECU-V1H050DM	Chip Ceramic 50V 5P	2	
C3136,3137	ECU-V1H102KBM	Chip Ceramic 50V 1000P	2	
C3138	ECSF1AE106	Tantalum 10V 10	1	
C3139	ECCF1H820J5	Ceramic 50V 82P	1	
C3140,3141	ECKF1H121KB	Ceramic 50V 120P	2	
C3142	ECQB1H103KH	Mylar 50V 0.01	1	
C3143	ECCF1H390J5	Ceramic 50V 39P	1	
C3144	ECKF1H391KB	Ceramic 50V 390P	1	
C3145	ECSF1CD105	Tantalum 16V 1	1	
		Coils		
L301	EL0405SKI-101K	100μH	1	
L302	EL0405SKI-150K	15μH	1	
L303,304	EL0405SKI-100K	10μH	2	
L305	EL0405SKI-220K	22μH	1	
L306	EL0405SKI-271K	270μH	1	
L307	EL0405SKI-121K	120μH	1	
L308	EL0405SKI-221K	220μH	1	
L309	EL0405SKI-101K	100μH	1	
L310	EL0405SKI-680K	68μH	1	
L311	EL0405SKI-220K	22μH	1	
L312,313	EL0405SKI-101K	100μH	2	
L314	EL0606SR-102K	1mH	1	
L315,316	EL0405SKI-101K	100μH	2	
L317	ELT-7F004	100μH	1	
L318,319	EL0405SKI-151K	150μH	2	
L320,321	ELEAH101KA	100μH	2	
		LC Filters		
LC301	ELB5D016		1	
LC302	ELB5G028		1	
LC303	ELB5E034		1	
LC304,305	ELB5D023		2	
		Delay Lines		
DL301	EFD-MA645C45E		1	
DL302	ELB-5E021		1	
DL303	EFDVN645B15B		1	
		Crystal		
X301	VSXK0065	3.58MHz	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
		Short Plugs		
P301	EMCS0650Z	6P	1	
P302	EMCS0250Z	2P	1	
P303	EMCS0950Z	9P	1	
P305	EMCS0850Z	8P	1	
P306	EMCS0250Z	2P	1	
P307	EMCS0650Z	6P	1	
P308	EMCS0250Z	2P	1	
P309	EMCS0450Z	4P	1	
P310	EMCS0250Z	2P	1	
		Miscellaneous		
CN302	VEKW0584	3P Connector Ass'y	1	
CN301	VEKW0597	8P Connector Ass'y	1	
CN303	VEKW0363	Lug Terminal Ass'y	1	
	VSCW0088	14MHz CCD Shield Case (A)	1	
	VSCW0089	14MHz CCD Shield Case (B)	1	
	VSCW0085	DL Shield Plate	1	
	VMZW0085	14MHz CCD Barrier	1	
		Deflection C.B.A.		
		Integrated Circuits		
IC601	AN6050		1	
IC602	AN374P		1	
IC603	AN2510S		1	
IC604,605	AN6552		2	
IC606	AN6914		1	
		Transistors		
Q601	2SB788		1	
Q602	2SD636(Q,R)		1	
Q603	2SB641(Q,R)		1	
Q604	2SC1565A		1	
Q605,606	2SA1018(Q,R)		2	
Q607	2SB709(Q,R)		1	
Q608	2SD662(Q,R)		1	
Q609	2SD636(Q,R)		1	
Q610,611	2SD662(Q,R)		2	
Q612	2SD636(Q,R)		1	
Q613,614	2SA1018(Q,R)		2	
Q615	2SD662(Q,R)		1	
Q616	2SD636(Q,R)		1	
Q617,618	2SB641(Q,R)		2	
Q619	2SD636(Q,R)		1	
Q620-622	2SB641(Q,R)		3	
Q623	2SD636(Q,R)		1	
Q624	2SD662(R)		1	
Q625	2SB641(Q,R)		1	
Q626	2SD669A		1	
Q627	2SD636(Q,R)		1	
Q628-630	2SB641(Q,R)		3	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
Q631		2SB793A		1	
Q632,633		2SD636(Q,R)		2	
Q634		2SD973A		1	
Q635		2SD636(Q,R)		1	
Q636		2SD973A		1	
Q637,638		2SD601(Q,R)		2	
Q639		2SD636(Q,R)		1	
Q640		2SD973A		1	
Q641		2SC1684(Q,R)		1	
			Diodes		
D601		MA165		1	
D602		ERB28-04D		1	
D604		ERB28-04D		1	
D605-609		MA165		5	
D610		MZL306B		1	
D611		1S954		1	
D612-614		0A90		3	
D615		MA165		1	
D616		MA27WA		1	
D617,618		MA165		2	
D619		MA1068-L		1	
			Resistors		
R601		ERJ8GCSJ683	Chip 68K	1	
R602		ERJ8GCSJ104	Chip 100K	1	
R603		ERJ8GCSJ222	Chip 2.2K	1	
R604		ERJ8GCSJ100	Chip 10	1	
R605		ERJ8GCSJ183	Chip 18K	1	
R606		ERJ8GCSJ823	Chip 82K	1	
R607		ERJ8GCSJ624	Chip 620K	1	
R609		ERJ8GCSJ390	Chip 39	1	
R611		ERJ8GCSJ103	Chip 10K	1	
R612		ERO10CKF5603	560K	1	
R613		ERJ8GCSJ683	Chip 68K	1	
R614		ERJ8GCSJ102	Chip 1K	1	
R615		ERJ8GCSJ472	Chip 4.7K	1	
R616,617		ERJ8GCSJ331	Chip 330	2	
R618		ERJ8GCSJ682	Chip 6.8K	1	
R619		ERJ8GCSJ334	Chip 330K	1	
R620		ERJ8GCSJ102	Chip 1K	1	
R621		ERJ8GCSJ223	Chip 22K	1	
R622		ERJ8GCSJ562	Chip 5.6K	1	
R623		ERJ8GCSJ102	Chip 1K	1	
R624		ERJ8GCSJ101	Chip 100	1	
R625		ERJ8GCSJ472	Chip 4.7K	1	
R626,627		ERJ8GCSJ104	Chip 100K	2	
R628,629		ERJ8GCSJ563	Chip 56K	2	
R630		ERJ8GCSJ682	Chip 6.8K	1	
R631		ERJ8GCSJ182	Chip 1.8K	1	
R632		ERJ8GCSJ682	Chip 6.8K	1	
R633		ERJ8GCSJ392	Chip 3.9K	1	
R634		ERJ8GCSJ473	Chip 47K	1	
R635		ERJ8GCSJ333	Chip 33K	1	
R636		ERJ8GCSJ682	Chip 6.8K	1	
R637		ERJ8GCSJ822	Chip 8.2K	1	
R638		ERJ8GCSJ182	Chip 1.8K	1	
R639		ERJ8GCSJ333	Chip 33K	1	
R640		ERJ8GCSJ103	Chip 10K	1	
R641		ERJ8GCSJ682	Chip 6.8K	1	
R642		ERJ8GCSJ223	Chip 22K	1	
R643		ERJ8GCSJ332	Chip 3.3K	1	
R644		ERJ8GCSJ392	Chip 3.9K	1	
R645		ERJ8GCSJ562	Chip 5.6K	1	
R646-650		ERJ8GCSJ154	Chip 150K	5	
R651		ERJ8GCSJ473	Chip 47K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R652-654		ERJ8GCSJ154	Chip 150K	3	
R655		ERJ8GCSJ472	Chip 4,7K	1	
R656		ERJ8GCSJ333	Chip 33K	1	
R657,658		ERJ8GCSJ103	Chip 10K	2	
R659		ERJ8GCSJ102	Chip 1K	1	
R660		ERJ8GCSJ682	Chip 6.8K	1	
R661		ERJ8GCSJ223	Chip 22K	1	
R662		ERJ8GCSJ273	Chip 27K	1	
R663		ERJ8GCSJ822	Chip 8.2K	1	
R664		ERJ8GCSJ223	Chip 22K	1	
R665		ERJ8GCSJ152	Chip 1.5K	1	
R666		ERJ8GCSJ272	Chip 2.7K	1	
R667		ERJ8GCSJ223	Chip 22K	1	
R668		ERJ8GCSJ472	Chip 4.7K	1	
R669		ERJ8GCSJ153	Chip 15K	1	
R670		ERJ8GCSJ562	Chip 5.6K	1	
R671		ERJ8GCSJ473	Chip 47K	1	
R672		ERJ8GCSJ102	Chip 1K	1	
R673		ERJ8GCSJ221	Chip 220	1	
R674		ERJ8GCSJ220	Chip 22	1	
R675		ERJ8GCSJ101	Chip 100	1	
R676		ERJ8GCSJ560	Chip 56	1	
R677		ERJ8GCSJ332	Chip 3.3K	1	
R678		ERJ8GCSJ472	Chip 4.7K	1	
R679		ERJ8GCSJ152	Chip 1.5K	1	
R680		ERJ8GCSJ124	Chip 120K	1	
R681		ERJ8GCSJ272	Chip 2.7K	1	
R682		ERDS2TJ104	100K	1	
R683		ERJ8GCSJ103	Chip 10K	1	
R685		ERJ8GCSJ332	Chip 3.3K	1	
R686		ERJ8GCSJ224	Chip 220K	1	
R687		ERJ8GCSJ103	Chip 10K	1	
R688		ERJ8GCSJ563	Chip 56K	1	
R689		ERJ8GCSJ102	Chip 1K	1	
R690		ERJ8GCSJ622	Chip 6.2K	1	
R691		ERJ8GCSJ222	Chip 2.2K	1	
R692		ERJ8GCSJ623	Chip 62K	1	
R693		ERJ8GCSJ103	Chip 10K	1	
R694		ERJ8GCSJ4R7	Chip 4.7	1	
R695		ERJ8GCSJ470	Chip 47	1	
R696		ERJ8GCSJ472	Chip 4.7K	1	
R697		ERJ8GCSJ512	Chip 5.1K	1	
R698		ERJ8GCSJ100	Chip 10	1	
R699		ERJ8GCSJ683	Chip 68K	1	
R6100		ERJ8GCSJ223	Chip 22K	1	
R6101		ERG1SJ4R7	1W 4.7	1	
R6102		ERJ8GCSJ470	Chip 47	1	
R6103		ERJ8GCSJ472	Chip 4.7K	1	
R6104		ERJ8GCSJ564	Chip 560K	1	
R6105		ERJ8GCSJ222	Chip 2.2K	1	
R6106		ERJ8GCSJ152	Chip 1.5K	1	
R6107		ERJ8GCSJ562	Chip 5.6K	1	
R6108		ERJ8GCSJ103	Chip 10K	1	
R6109		ERJ8GCSJ471	Chip 470	1	
R6110		ERJ8GCSJ104	Chip 100K	1	
R6111		ERJ8GCSJ152	Chip 1.5K	1	
R6112		ERJ8GCSJ103	Chip 10K	1	
R6113		ERJ8GCSJ472	Chip 4.7K	1	
R6114		ERJ8GCSJ562	Chip 5.6K	1	
R6115		ERJ8GCSJ133	Chip 13K	1	
R6116		ERJ8GCSJ243	Chip 24K	1	
R6117		ERJ8GCSJ152	Chip 1.5K	1	
R6118		ERJ8GCSJ153	Chip 15K	1	
R6119		ERJ8GCSJ183	Chip 18K	1	
R6120		ERJ8GCSJ912	Chip 9.1K	1	
R6121		ERJ8GCSJ153	Chip 15K	1	
R6122,6123		ERO10CKF1502	15K	2	
R6124		ERO10CKF4702	47K	1	
R6125		ERO10CKF1001	1K	1	
R6126		ERJ8GCSJ222	Chip 2.2K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R6127		ERJ8GCSJ103	Chip 10K	1	
R6128		ERJ8GCSJ334	Chip 330K	1	
R6129		ERJ8GCSJ224	Chip 220K	1	
R6130		ERJ8GCSJ103	Chip 10K	1	
R6131		ERJ8GCSJ562	Chip 5.6K	1	
R6132		ERJ8GCSJ563	Chip 56K	1	
R6133		ERJ8GCSJ562	Chip 5.6K	1	
R6134		ERJ8GCSJ102	Chip 1K	1	
R6135		ERJ8GCSJ223	Chip 22K	1	
R6136		ERJ8GCSJ104	Chip 100K	1	
R6137		ERJ8GCSJ153	Chip 15K	1	
R6138		ERJ8GCSJ222	Chip 2.2K	1	
R6139		ERJ8GCSJ562	Chip 5.6K	1	
R6140		ERDS2TJ561	560	1	
R6141		ERDS2TJ392	3.9K	1	
R6142		ERDS2TJ154	150K	1	
R6143		ERDS2TJ472	4.7K	1	
R6144		ERDS2TJ224	220K	1	
			Multiple Variable		
			Resistors		
BR601		EVMD6GA00071	5KB	1	
BR602,603		EVMD6GA00073	100KB	2	
			Variable Resistors		
VR601		EVN1ACA00B34	30K	1	
VR602		EVM1AGA00B35	300K	1	
VR603		EVN1ACA00B34	30K	1	
VR604		EVM1AGA00B16	1M	1	
VR605		EVN1ACA00B14	10K	1	
VR606		EVM1AGA00B55	500K	1	
VR607		EVN1ACA00B34	30K	1	
VR608-611		EVN1ACA00B14	10K	4	
VR612		EVN1ACA00B33	3K	1	
VR613		EVM1AGA00B12	100	1	
VR614		EVN1ACA00B34	30K	1	
VR615,616		EVN1ACA00B33	3K	2	
VR617		EVN1ACA00B15	100K	1	
VR618,619		EVN1ACA00B13	1K	2	
			Capacitors		
C601		ECEA2AS010	Electrolytic 100V 1	1	
C602		ECU-V1H222KBM	Chip Ceramic 50V 2200P	1	
C603		ECEA1CK100	Electrolytic 16V 10	1	
C604		ECU-V1H271KCM	Chip Ceramic 50V 270P	1	
C605		ECQV05154JZ	Mylar 50V 0.15	1	
C606		ECEA1AK330	Electrolytic 10V 33	1	
C607		ECEA1AK470	Electrolytic 10V 47	1	
C608		ECU-V1H472KBM	Chip Ceramic 50V 4700P	1	
C609		ECSF1CD225	Tantalum 16V 2.2	1	
C610		ECEA1ASS221	Electrolytic 10V 220	1	
C611		ECU-V1H103KBM	Chip Ceramic 50V 0.01	1	
C612		NCUV1E104ZFM	Chip Ceramic 25V 0.1	1	
C613		ECEA1AK470	Electrolytic 10V 47	1	
C614		ECQF6102KZ	Mylar 630V 0.001	1	
C615,616		ECEA1CK100	Electrolytic 16V 10	2	
C617		ECU-V1H272KBM	Chip Ceramic 50V 2700P	1	
C618		ECEA1AK470	Electrolytic 10V 47	1	
C619		ECU-V1H102KBM	Chip Ceramic 50V 1000P	1	
C620		ECU-V1H472KBM	Chip Ceramic 50V 4700P	1	
C621		ECQE10472MV	Mylar 1kV 0.0047	1	
C622		ECEA2WS010	Electrolytic 450V 1	1	
C623		ECQM4472MZ	Mylar 400V0.0047	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C624		ECU-V1H101KM	Chip Ceramic 50V 100P	1	
C625		ECEA2CS010	Electrolytic 160V 1	1	
C626		ECQE1104KN	Mylar 100V 0.1	1	
C627		ECEA2CS010	Electrolytic 160V 1	1	
C628		NCUV1E104ZFM	Chip Ceramic 25V 0.1	1	
C629,630		ECSF1CD474	Tantalum 16V 0.47	2	
C631-635		ECEA1CK100	Electrolytic 16V 10	5	
C636		ECQE4473MZ	Mylar 400V 0.047	1	
C637		ECEA2AS010	Electrolytic 100V 1	1	
C638		ECEA1ASS101	Electrolytic 10V 100	1	
C639		ECEA2AS010	Electrolytic 100V 1	1	
C640		ECEA1CK100	Electrolytic 16V 10	1	
C641		ECU-V1H103KBM	Chip Ceramic 50V 0.01	1	
C642		ECQF6102KZ	Mylar 630V 0.001	1	
C643		ECEA1AK470	Electrolytic 10V 47	1	
C644		ECEA1HN3R3S	Electrolytic 50V 3.3	1	
C645		ECQM2102MZ	Mylar 200V 0.001	1	
C646		ECU-V1H102KBM	Chip Ceramic 50V 1000P	1	
C647		ECU-V1H101KM	Chip Ceramic 50V 100P	1	
C648		ECEA1HK3R3	Electrolytic 50V 3.3	1	
C649		ECU-V1H391KM	Chip Ceramic 50V 390P	1	
C650,651		ECU-V1H102KBM	Chip Ceramic 50V 1000P	2	
C652		ECU-V1H121KM	Chip Ceramic 50V 120P	1	
C653		ECEA1ASS101	Electrolytic 10V 100	1	
C654		ECQP1331JZ	Mylar 100V 330P	1	
C655		ECEA1AK470	Electrolytic 10V 47	1	
C656,657		ECEA1AF470	Electrolytic 10V 47	2	
C658		ECU-V1H472KBM	Chip Ceramic 50V 4700P	1	
C659		ECU-V1H561KM	Chip Ceramic 50V 560P	1	
C660		ECU-V1H181KM	Chip Ceramic 50V 180P	1	
C661		ECEA1HK010	Electrolytic 50V 1	1	
C662		ECEA1AF470	Electrolytic 10V 47	1	
C663		ECEA1HK010	Electrolytic 50V 1	1	
C664		ECQV05563JZ	Mylar 50V 0.056	1	
C665		ECU-V1H561KM	Chip Ceramic 50V 560P	1	
C666		ECQP1152JZ	Mylar 100V0.0015	1	
C667		ECEA1CK100	Electrolytic 16V 10	1	
C668		ECQV05223JZ	Mylar 50V 0.022	1	
C669		ECEA1HKN010	Electrolytic 50V 1	1	
C670		ECCR1H121J	Ceramic 50V 120P	1	
C671		NCUV1E104ZFM	Chip Ceramic 25V 0.1	1	
C672		ECEA1HN2R2S	Electrolytic 50V 2.2	1	
C673		ECU-V1H221KCM	Chip Ceramic 50V 220P	1	
C674,675		ECEA0JK470	Electrolytic 6.3V 47	2	
C676		ECSF1CD684	Tantalum 16V 0.68	1	
C677		ECEA0JK470	Electrolytic 6.3V 47	1	
C678		ECEA0JSS221	Electrolytic 6.3V 220	1	
C679		ECEA1ESS471-U	Electrolytic 25V 470	1	
C680,681		ECEA1ESS101	Electrolytic 25V 100	2	
C682		ECEA1AK470	Electrolytic 10V 47	1	
C683		ECEA1CK100	Electrolytic 16V 10	1	
C684		ECEA0JSS471	Electrolytic 6.3V 470	1	
C685		ECSF1AE106	Tantalum 10V 10	1	
C686		ECEA0JSS221	Electrolytic 6.3V 220	1	
C687		ECEA1CK100	Electrolytic 16V 10	1	
C688,689		NCUV1E104ZFM	Chip Ceramic 25V 0.1	2	
C690		ECU-V1H561KM	Chip Ceramic 50V 560P	1	
C691		ECU-V1H102KBM	Chip Ceramic 50V 1000P	1	
C692		ECEA1CK100	Electrolytic 16V 10	1	
			Coils		
L601,602		VLQ7H101K	100µH	2	
L603,604		VLQ9H333J	33mH	2	
L605		VLQ9H391K	390µH	1	
L606		ELC08G003	50µH	1	
L607		ELC09J001	670µH	1	
L608		ELC08G003	50µH	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
L609	FL9H470K-40	50μH	1	
		Fuse		
F601	XBA1H16NU100		1	
		F.B.T.		
T601	TLF69993		1	
		Switch		
SW601	VSSW0019	Mode Selection SW	1	
		Short Plugs		
P601	EMCS0350Z	3P	1	
P602	EMCS0650Z	6P	1	
P603	EMCS0250Z	2P	1	
P604	EMCS0650Z	6P	1	
P605	EMCS0750Z	7P	1	
P606,607	EMCS0350Z	3P	2	
P608	ECMS0550Z	5P	1	
P609	EMCS0250Z	2P	1	
P610	EMCS0750Z	7P	1	
P611	EMCS0350Z	3P	1	
P612	EMCS0850Z	8P	1	
		Miscellaneous		
CN601	VEKW0600	9P Connector Ass'y	1	
CN603	VEKW0095	Lug Terminal Ass'y	1	
	VSCW0083	AVR Shield Case (A)	1	
	VSCW0084	AVR Shield Case (B)	1	
	VMZW0086	AVR barrier	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
		Socket C.B.A.		
		Resistor		
R6200	ERDS2TJ105	1M	1	
		Capacitor		
C6200	ECQE16682N67	Mylar 1600V 0.0068	1	
		Miscellaneous		
	VJSK1116	New Vicon Socket	1	
CN602	VEKW0594	6P Board in Connector Ass'y	1	
		Rear Side C.B.A.		
		Switches		
SW501	ESD-14194	Nega/Posi SW	1	
SW502	ESD-32166	Standby SW	1	
SW503	VSSW0019	EIAJ/Normal SW	1	
		Resistor		
R501	ERD25TJ560	1/4W 56	1	
		Miscellaneous		
CN501	VEKW0538	3P Connector Ass'y	1	
CN502	VEKW0595	6P Connector Ass'y	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Stereo C.B.A.		
			Integrated Circuit		
IC401		AN6558S		1	
			Transistors		
Q401		2SD601(Q,R)		1	
Q402,403		2SD602(Q,R)		2	
Q404		2SD601(Q,R)		1	
Q405		2SD602(Q,R)		1	
			Diodes		
D401-404		OA90		4	
			Resistors		
R401		ERJ8GCSJ472	Chip 4.2K	1	
R403,404		ERJ8GCSJ272	Chip 2.7K	2	
R405		ERJ8GCSJ152	Chip 1.5K	1	
R406		ERJ8GCSJ102	Chip 1K	1	
R407		ERJ8GCSJ681	Chip 680	1	
R408		ERJ8GCSJ102	Chip 1K	1	
R409		ERJ8GCSJ681	Chip 680	1	
R410		ERJ8GCSJ102	Chip 1K	1	
R411		ERJ8GCSJ560	Chip 56	1	
R412		ERJ8GCSJ104	Chip 100K	1	
R413		ERJ8GCSJ102	Chip 1K	1	
R414		ERJ8GCSJ104	Chip 100K	1	
R415		ERJ8GCSJ560	Chip 56	1	
R416		ERJ8GCSJ681	Chip 680	1	
R417		ERJ8GCSJ274	Chip 270K	1	
R418		ERJ8GCSJ101	Chip 100	1	
R419,420		ERJ8GCSJ104	Chip 100K	2	
R421		ERJ8GCSJ101	Chip 100	1	
R422		ERJ8GCSJ274	Chip 270K	1	
R423		ERJ8GCSJ681	Chip 680	1	
R424		ERJ8GCSJ103	Chip 10K	1	
R425		ERJ8GCSJ104	Chip 100K	1	
R426		ERJ8GCSJ103	Chip 10K	1	
R427		ERJ8GCSJ104	Chip 100K	1	
R428		ERJ8GCSJ271	Chip 270	1	
R429		ERJ8GCSJ103	Chip 10K	1	
R430,431		ERJ8GCSJ104	Chip 100K	2	
R432		ERJ8GCSJ393	Chip 39K	1	
			Capacitors		
C401,402		ECEA1HKN010	Electrolytic 50V 1	2	
C403,404		ECEA1HK010	Electrolytic 50V 1	2	
C405		ECU-V1H680KM	Chip Ceramic 50V 68P	1	
C406		ECEA0JK101	Electrolytic 6.3V 100	1	
C407		ECEA1CK100	Electrolytic 16V 10	1	
C408		ECEA1HK010	Electrolytic 50V 1	1	
C409		ECEA1CK100	Electrolytic 16V 10	1	
C410		ECEA1HK010	Electrolytic 50V 1	1	
C411		ECU-V1H680KM	Chip Ceramic 50V 68P	1	
C412,413		ECEA1HK2R2	Electrolytic 50V 2.2	2	
C414		ECEA1HK010	Electrolytic 50V 1	1	
C415		ECEA0JK470	Electrolytic 6.3V 47	1	
C416		ECEA1HK010	Electrolytic 50V 1	1	
C417		ECEA0JK470	Electrolytic 6.3V 47	1	
C418		ECEA1ASS221	Electrolytic 10V 220	1	
C419		ECEA1AK470	Electrolytic 10V 47	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
C420		ECEA0JK101	Electrolytic 6.3V 100	1	
C421		ECEA1CK100	Electrolytic 16V 10	1	
			Coil		
L401		ELEMH102KA	1mH	1	
			Short Plugs		
P402		EMCS0350Z	3P	1	
P404		EMCS0450Z	4P	1	
P405		EMCS0350Z	3P	1	
P406		EMCS0650Z	6P	1	
			Miscellaneous		
CN401		VEKW0578	2P Connector Ass'y	1	
CN402		VEKW0579	2P Connector Ass'y	1	
			Stereo Jack C.B.A.		
		VJJW0004	Jack	2	
CN403		VEKW0592	6P Connector Ass'y	1	
		VEKW0095	Lug Terminal Ass'y	1	
			Stereo/Mono C.B.A.		
		VSSW0025	Stereo/Mono Selection SW	1	
CN404		VEKW0589	4P Connector Ass'y	1	
			Rec/Rev C.B.A.		
		EVQ-QSH04G	Rec/Rev SW	1	
CN001		VEKW0586	4P Connector Ass'y	1	
			Tally SW C.B.A.		
		VSSW0023	Tally SW	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Power Zoom (A) C.B.A.		
			Transistors		
Q801-804		2SD601(Q,R)		4	
			Resistors		
R801		ERJ8GCSJ331	Chip 330	1	
R802		ERJ8GCSJ560	Chip 56	1	
R803,804		ERJ8GCSJ103	Chip 10K	2	
R805,806		ERJ8GCSJ822	Chip 8.2K	2	
			Variable Resistor		
VR801		EVJ-FDAF20B53	5K	1	
			Capacitors		
C801		ECEA1ASS221	Electrolytic 10V 220	1	
C802,803		EECW2R3A3R3	Gold Capacitor 2.3V 3.3F	2	
			Switch		
SW801		VSSW0022	Zoom SW	1	
			Miscellanous		
CN801		VEKW0581	2P Connector Ass'y	1	
CN803		VEKW0585	3P Connector Ass'y	1	
			Power Zoom SW (B) C.B.A.		
			Miscellaneous		
		VSSW0022	Zoom SW	1	
CN804		VEKW0556	2P Connector Ass'y	1	
			Front C.B.A.		
			Miscellaneous		
		VSSW0023	Fade SW	1	
CN002		VEKW0580	2P Connector Ass'y	1	
CN003		VEKW0588	4P Connector Ass'y	1	
VR3200,3201		VRVW0001	R.B Variable Resitor	2	
			Etc.		
			Miscellaneous		
		VEKW0601	Bias Light Ass'y	1	
		S4165	New Vicon	1	
		ELY-18A208J	DY Ass'y	1	
		VEKW0608	Camera Cable Ass'y	1	
		VEKW0574	12P Socket Ass'y	1	
		VEKW0367	Power Transistor Ass'y	1	
CN004		VEKW0636	2P Connector Ass'y	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
		VEKW0645	Zoom Motor Ass'y	1	
		VVAW0013	Iris Motor Ass'y	1	
			Camera Remo. Con. (A) C.B.A.		
			Integrated Circuits		
IC701		MN1227A		1	
IC703		µPD4066BC		1	
			Transistors		
Q708-716		2SD601(Q,R)	Chip	9	
Q717,718		2SB709(Q,R)	Chip	2	
Q719		2SD601(Q,R)	Chip	1	
Q721,722		2SD601(Q,R)	Chip	2	
			Diodes		
D703		MA151K	Chip	1	
D717,718		MA165		2	
			Resistors		
R701		ERTD2FHL802S	Thermistor 8K	1	
R702		ERJ8GCSJ102	Chip 1K	1	
R722		ERJ8GCSJ563	Chip 56K	1	
R730		ERJ8GCSJ223	Chip 22K	1	
R731		ERJ8GCSJ224	Chip 220K	1	
R732		ERJ8GCSJ562	Chip 5.6K	1	
R733		ERJ8GCSJ104	Chip 100K	1	
R734		ERJ8GCSJ561	Chip 560	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R735		ERJ8GCSJ222	Chip 2.2K	1	
R736		ERJ8GCSJ220	Chip 22	1	
R737		ERJ8GCSJ562	Chip 5.6K	1	
R738		ERJ8GCSJ222	Chip 2.2K	1	
R746		ERJ8GCSJ103	Chip 10K	1	
R749		ERJ8GCSJ223	Chip 22K	1	
R750		ERJ8GCSJ104	Chip 100K	1	
R751		ERJ8GCSJ224	Chip 220K	1	
R752		ERJ8GCSJ223	Chip 22K	1	
R753		ERJ8GCSJ104	Chip 100K	1	
R754		ERJ8GCSJ224	Chip 220K	1	
R755		ERJ8GCSJ223	Chip 22K	1	
R756		ERJ8GCSJ104	Chip 100K	1	
R757		ERJ8GCSJ224	Chip 220K	1	
R758		ERJ8GCSJ472	Chip 4.7K	1	
R759		ERJ8GCSJ560	Chip 56	1	
R760		ERJ8GCSJ273	Chip 27K	1	
R761		ERJ8GCSJ224	Chip 220K	1	
R762		ERJ8GCSJ124	Chip 120K	1	
R768		ERDS2TJ105	1/4W 1M	1	
R769,770		ERJ8GCSJ105	Chip 1M	2	
R771-775		ERDS2TJ105	1/4W 1M	5	
R776,777		ERJ8GCSJ104	Chip 100K	2	
R778		ERJ8GCSJ683	Chip 68K	1	
R779		ERJ8GCSJ103	Chip 10K	1	
R780		ERJ8GCSJ104	Chip 100K	1	
R781		ERJ8GCSJ224	Chip 220K	1	
R782		ERDS2TJ124	120K	1	
R784		ERJ8GCSJ124	Chip 120K	1	
R785		ERJ8GCSJ564	Chip 560K	1	
R786		ERJ8GCSJ472	Chip 4.7K	1	
R787		ERDS2TJ103	10K	1	
R788		ERDS2TJ105	1M	1	
			Variable Resistor		
VR701		EVN3ACA00B13	1K	1	
			Capacitors		
C701		ECCF1H560KW	Ceramic 50V 56P	1	
C702		ECEA1AF470	Electrolytic 10V 47	1	
C709,710		ECEA1HKR47	Electrolytic 50V 0.47	2	
			Coil		
L701		EL0606SK-101K	100µH	1	
			Short Plug		
P703		EMCS0950ZL	9P	1	
P704		EMCS0450ZL	4P	1	
			Miscellaneous		
CN703		VEKW0587	3P Connector Ass'y	1	
CN704		VEKW0593	6P Connector Ass'y	1	
		VSCW0086	Remo. Con. Shield Case	1	
			(A)		
		VSCW0087	Remo. Con. Shield Case	1	
			(B)		
		VMZW0087	Remo. Con. Insulation	1	
			Sheet		

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
			Camera Remo. Con. (B)		
			C.B.A.		
			Integrated Circuits		
IC702		AN6914		1	
IC704		µPD7508G-536		1	
IC705		AN6914		1	
			Transistors		
Q701-707		2SD601(Q,R)	Chip	7	
Q720		2SB709(Q,R)	Chip	1	
			Diodes		
D701,702		MA151K	Chip	2	
D704		MA165		1	
D705		EQA02-12AB		1	
D706		MA151K	Chip	1	
D707		EQA02-12AB		1	
D708,709		MA151K	Chip	2	
D710		1S954		1	
D711		MA165		1	
			Resistors		
R703		ERJ8GCSJ153	Chip 15K	1	
R704		ERJ8GCSJ273	Chip 27K	1	
R705		ERJ8GCSJ243	Chip 24K	1	
R706		ERJ8GCSJ153	Chip 15K	1	
R707		ERJ8GCSJ333	Chip 33K	1	
R709		ERJ8GCSJ562	Chip 5.6K	1	
R710		ERJ8GCSJ124	Chip 120K	1	
R711		ERJ8GCSJ184	Chip 180K	1	
R712		ERJ8GCSJ563	Chip 56K	1	
R713		ERJ8GCSJ224	Chip 220K	1	
R714		ERJ8GCSJ563	Chip 56K	1	
R715		ERJ8GCSJ223	Chip 22K	1	
R716		ERJ8GCSJ104	Chip 100K	1	
R717		ERJ8GCSJ224	Chip 220K	1	
R718		ERJ8GCSJ562	Chip 5.6K	1	
R719		ERJ8GCSJ124	Chip 120K	1	
R720		ERJ8GCSJ220	Chip 22	1	
R721		ERJ8GCSJ152	Chip 1.5K	1	
R723		ERJ8GCSJ103	Chip 10K	1	
R724		ERJ8GCSJ223	Chip 22K	1	
R725		ERJ8GCSJ222	Chip 2.2K	1	
R726		ERDS2TJ270	27	1	
R727,728		ERJ8GCSJ563	Chip 56K	2	
R729		ERJ8GCSJ123	Chip 12K	1	
R739		ERJ8GCSJ222	Chip 2.2K	1	
R740,741		ERJ8GCSJ224	Chip 220K	2	
R742		ERJ8GCSJ222	Chip 2.2K	1	
R743		ERJ8GCSJ684	Chip 680K	1	
R744		ERJ8GCSJ223	Chip 22K	1	
R745		ERJ8GCSJ104	Chip 100K	1	
R747,748		ERJ8GCSJ103	Chip 10K	2	
R767		ERJ8GCSJ105	Chip 1M	1	
R783		ERJ8GCSJ223	Chip 22K	1	
			Capacitors		
C703		NCUV1E104ZFM	Ceramic 25V 0.1	1	

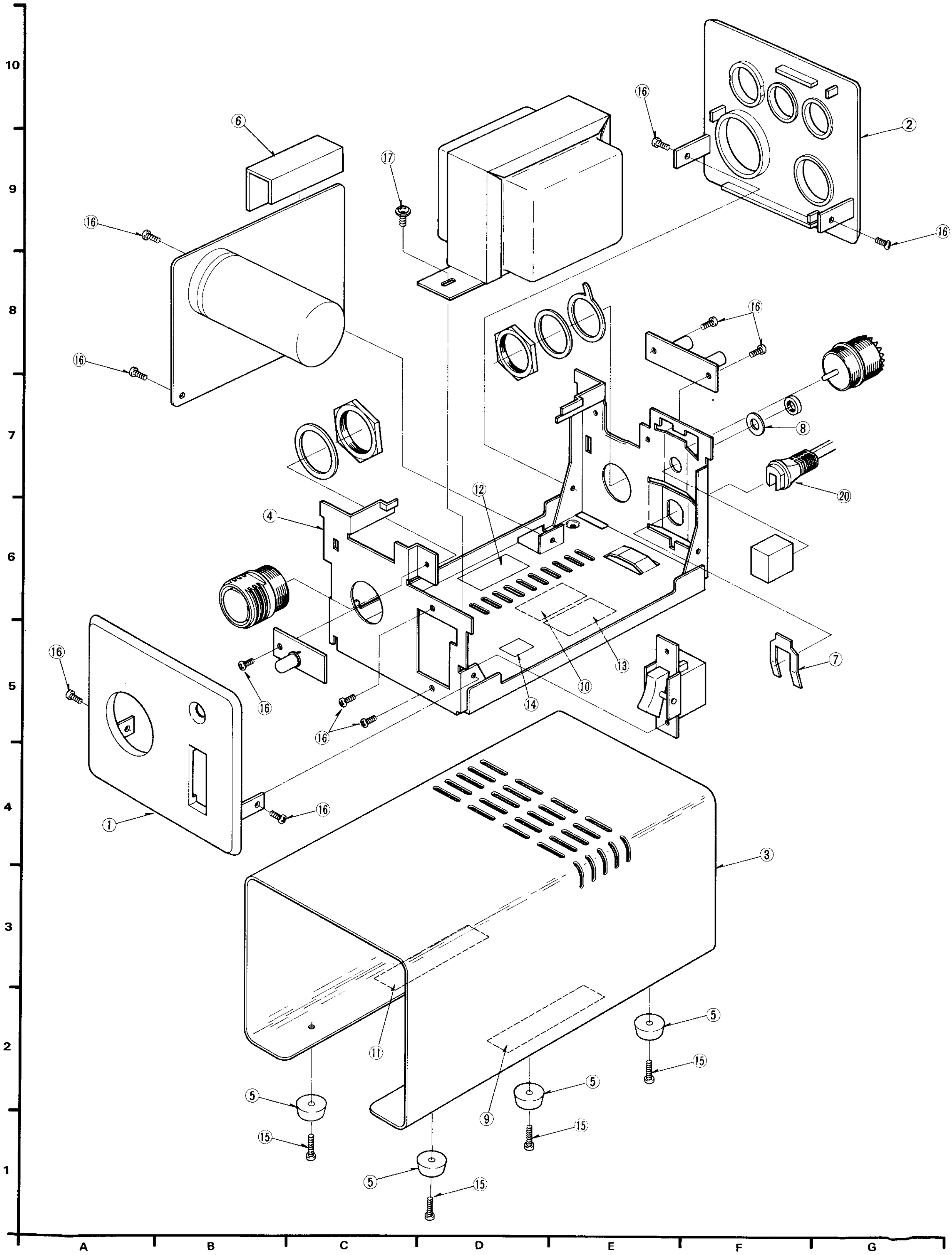
Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
C704	ECEA0JN330S	Electrolytic 6.3V 33	1	
C705	ECEA0JK470	Electrolytic 6.3V 47	1	
C708	ECU-V1H101KM	Chip Ceramic 50V 100P	1	
C711	ECU-V1H221KM	Chip Ceramic 50V 220P	1	
C712	ECU-V1H561KM	Chip Ceramic 50V 560P	1	
C713,714	ECU-V1H220KM	Chip Ceramic 50V 22P	2	
C715	ECEA1AF470S	Electrolytic 10V 47	1	
		Short Plugs		
P701	EMCS0950ZL	9P	1	
P702	EMCS0550ZL	5P	1	
P705	EMCS0350ZL	3P	1	
P706	EMCS0250ZL	2P	1	
		Crystals		
X701	VSX0094	32.768kHz	1	
X702	VSXW0009	250kHz	1	
		Miscellaneous		
CN705	VEKW0596	7P Connector Ass'y	1	
		Camera Remo. Con. (SW)		
		C.B.A.		
		Diodes		
D712-715	MA151WA	Chip	4	
D716	MA151K	Chip	1	
		Resistors		
R763-766	ERJ8GCSJ563	Chip 56K	4	
		Switches		
SW701	VSSW0021	Camera Selection SW	1	
SW702	VSSW0025	VCR/Camera Selection SW	1	
		Miscellaneous		
CN702	VEKW0590	5P Connector Ass'y	1	
CN701	VEKW0599	9P Connector Ass'y	1	

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
		Camera Remo. Con. Etc.		
		Miscellaneous		
	VEKW0603	PC Joiner (A)	1	
	VEKW0604	PC Joiner (B)	1	
CN706	VEKW0598	8P Connector Ass'y	1	
CN802	VEKW0582	2P Connector Ass'y	1	
CN707	VEKW0637	2P Connector Ass'y	1	
CN708	VEKW0635	10P Socket Ass'y	1	
		E.V.F. Print C.B.A.		
		Transistors		
Q901	2SD662		1	
Q902	2SC1567		1	
Q903-905	2SD636(Q,R)		3	
Q906	2SB642(Q,R)		1	
Q907,908	2SD636(Q,R)		2	
		Diodes		
D901	S1B01-01		1	
D902	MA165		1	
D903	S1B01-01		1	
		Resistors		
R901	ERDS2TJ183	1/4W 18K	1	
R902	ERDS2TJ332	1/4W 3.3K	1	
R903	ERDS2TJ821	1/4W 820	1	
R904	ERDS2TJ103	1/4W 10K	1	
R905	ERDS2TJ220	1/4W 22	1	
R906	ERDS2TJ333	1/4W 33K	1	
R907,908	ERDS2TJ105	1/4W 1M	2	
R909	ERDS2TJ152	1/4W 1.5K	1	
R910	ERDS2TJ102	1/4W 1K	1	
R911	ERDS2TJ273	1/4W 27K	1	
R912,913	ERD25VJ225	1/4W 2.2M	2	
R914	ERD25VJ185	1/4W 1.8M	1	
R915	ERDS2TJ102	1/4W 1K	1	

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
R916,917		ERDS2TJ823	1/4W 82K	2	
R918		ERDS2TJ102	1/4W 1K	1	
R919		ERDS2TJ562	1/4W 5.6K	1	
R920		ERDS2TJ102	1/4W 1K	1	
R921		ERDS2TJ222	1/4W 2.2K	1	
R922		ERDS2TJ152	1/4W 1.5K	1	
R923		ERDS2TJ102	1/4W 1K	1	
R924		ERDS2TJ562	1/4W 5.6K	1	
R925		ERDS2TJ392	1/4W 3.9K	1	
R926		ERDS2TJ223	1/4W 22K	1	
R927		ERDS2TJ222	1/4W 2.2K	1	
			Variable Resistors		
VR901		EVM-3AGA00B55	500K	1	
VR902		EVM-7AGA00B26	2M	1	
			Capacitors		
C901		ECEA1AK470	Electrolytic 10V 47	1	
C902		ECCR1H271J5	Ceramic 50V 270P	1	
C903		ECEA1JS100	Electrolytic 63V 10	1	
C904		VCAMX50V473J	Mylar 50V 0.047	1	
C905		ECQE2104KS	Mylar 250V 0.1	1	
C906		ECEA1CS471S	Electrolytic 16V 470	1	
C907		ECEA1AK470	Electrolytic 10V 47	1	
C908		ECEA1JS220	Electrolytic 63V 22	1	
C909		VCAMS100V392J	Mylar 100V0.0039	1	
C910		NCKD3A392KB	Ceramic 1kV 3900P	1	
C911		ECQE2104KS	Mylar 250V 0.1	1	
C912		NCKD3A152KB	Ceramic 1kV 1500P	1	
C913-915		ECEA1HK010	Electrolytic 50V 1	3	
			Coils		
L901		VLQ9H391K	390μH	1	
L902		ELH5L103	Lineality Coil 310μH	1	
			F.B.T.		
T901		TLF69954		1	
			Short Plugs		
P901		EMCS0650Z	6P	1	
P902		EMCS0350Z	3P	1	
P903		EMCS0450Z	4P	1	
P905		EMCS0550Z	5P	1	
P906		EMCS0350Z	3P	1	
			Switch		
SW901		VSSW0026	R.L Selection SW	1	
			Miscellaneous		
		VEKW0602	CRT Socket Ass'y	1	
		VEKW0610	12P Cable Ass'y	1	
			E.V.F. LED C.B.A.		
			Diodes		

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
D904		TLRG101	A.W.C.	1	
D905		TLG124A	Tally	1	
D906		TL0124	Fade	1	
			Miscellaneous		
		VEKW0378	Ground Spring Ass'y	1	
		VXFW0009	LED Spacer Ass'y	1	
CN901		VEKW0591	5P Connector Ass'y	1	
			Etc.		
			Miscellaneous		
		ELY-10V001A	DY Ass'y	1	
		30FB4	CRT	1	
		VEKW0387-1	Tally LED Ass'y	1	
			Nega/Posi C.B.A.		
			Transistors		
Q364		2SB709(Q,R)	Chip	1	
Q365-371		2SD601(Q,R)	Chip	7	
Q372-374		2SC2404	Chip	3	
Q375,376		2SD601(Q,R)	Chip	2	
			Resistors		
R3246		ERJ8GCSJ562	Chip 5.6K	1	
R3247		ERJ8GCSJ332	Chip 3.3K	1	
R3248		ERJ8GCSJ272	Chip 2.7K	1	
R3249		ERJ8GCSJ152	Chip 1.5K	1	
R3250		ERJ8GCSJ222	Chip 2.2K	1	
R3251		ERJ8GCSJ151	Chip 150	1	
R3252		ERJ8GCSJ561	Chip 560	1	
R3253,3254		ERJ8GCSJ102	Chip 1K	2	
R3255		ERJ8GCSJ562	Chip 5.6K	1	
R3256		ERJ8GCSJ472	Chip 4.7K	1	
R3257,3258		ERJ8GCSJ562	Chip 5.6K	2	
R3259		ERJ8GCSJ102	Chip 1K	1	
R3260		ERJ8GCSJ681	Chip 680	1	
R3261		ERJ8GCSJ471	Chip 470	1	
R3262		ERJ8GCSJ561	Chip 560	1	
R3263		ERJ8GCSJ182	Chip 1.8K	1	
R3264		ERJ8GCSJ102	Chip 1K	1	
R3265,3266		ERJ8GCSJ562	Chip 5.6K	2	
R3267		ERJ8GCSJ103	Chip 10K	1	
			Capacitors		
C3128		ECKF1H221KB	Ceramic 50V 220P	1	
C3129		ECEA1HKNR47	Electrolytic 50V 0.47	1	
C3130,3131		ECEA1CK100	Electrolytic 16V 10	2	
C3132		ECEA1CK100	Electrolyic 16V 10	1	
C3133		ECEA0JK470	Electrolytic 6.3V 47	1	

❶ *Power Supply Unit Section (optional accessory)*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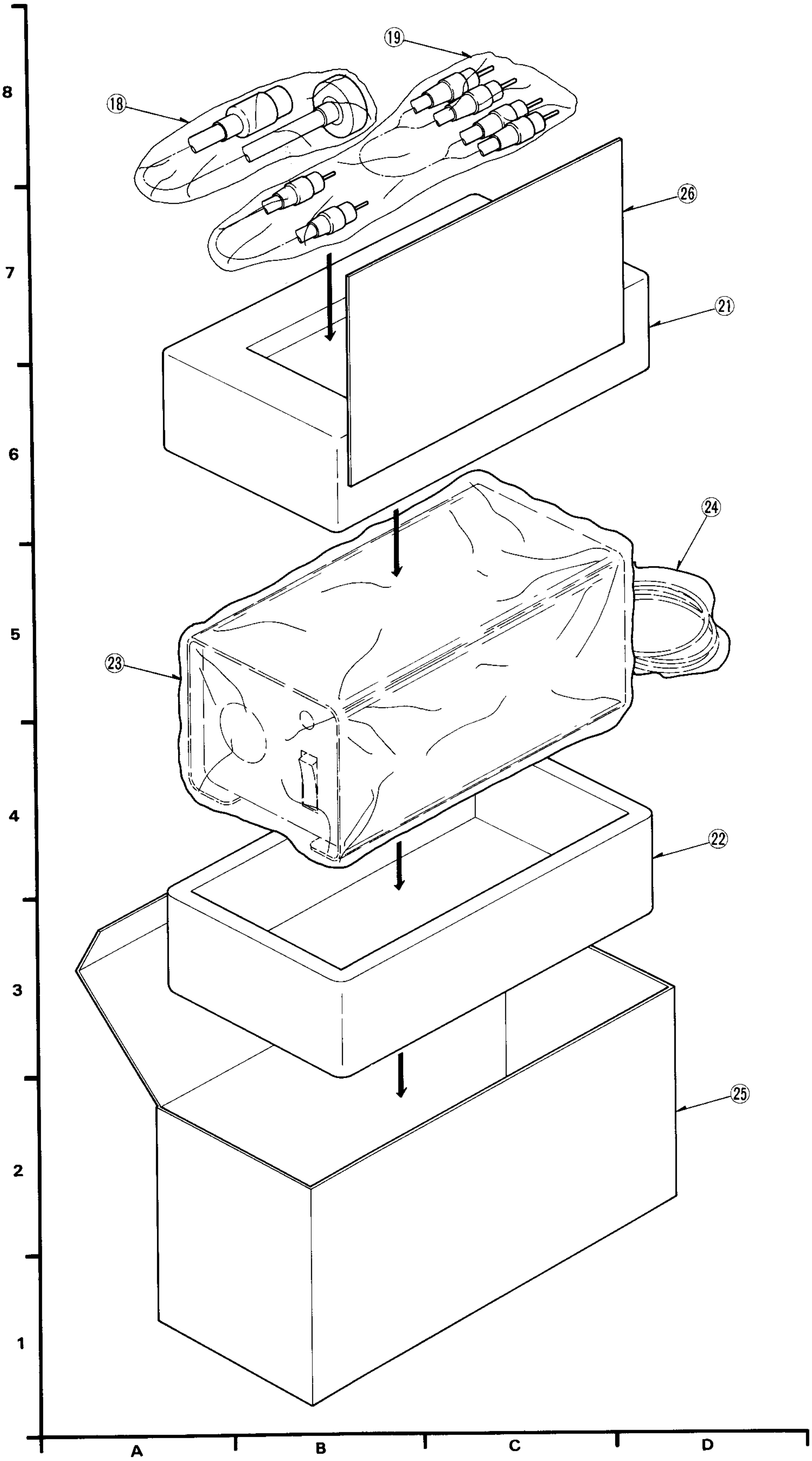
❷ Packing Parts Section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Mechanical Replacement Parts List

Note: * Be sure to make your orders of replacement parts according to this list.
○ . . . . Available replacement part
X . . . . Not available as replacement
☐ . . . . Only available on special order

Item No.	Drawing No.	Description	Pcs/ Set	Availa-bility	Part No.	Remark
		PSU				
1	1	PSU FRONT COVER	1	o	VKGW0383	
2	1	BACK COVER	1	o	VKGW0372	
3	1	TOP COVER	1	o	VKGW0091	
4	1	MAIN CHASSIS	1	o	VMKW0040	
5	1	RUBBER LEG	4	o	VKAW0001	
6	1	FUSE COVER	1	o	VJFW0001	
7	1	AC CORD PLATE	1	o	VMAW0018	
8	1	WASHER	1	o	VMXW0006	
		LABEL				
9	1	PSU CAUTION LABEL	1	o	VQLW0534	
10	1	PSU LABEL	1	o	VQLW0543	
11	1	ATTENTION LABEL	1	o	VQLW0001	
12	1	FUSE LABEL (CAUTION)	1	o	VQLW0004	
13	1	FUSE LABEL (ATTENTION)	1	o	VQLW0003	
14	1	PSU CHASSIS LABEL	1	o	VQLW0074	
		SCREW				
15	1	BINDING HEAD MACHINE SCREWS				
		3øx8MM	4	o	XSB3+8FXK	
16	1	BINDING HEAD TAPPING SCREWS				
		3øx6MM	11	o	XTB3+6FFU	
17	1	PAN HEAD WITH WASHER ASS'Y				
		4øx6MM	1	o	XYN4+F6FU	
		CABLE				
18	2	VIDEO CABLE ASS'Y	1	o	VFAK0006	
19	2	STEREO/REMO.CON. CABLE	1	o	VFAW0010	
		ASS'Y				
20	1	AC CORD	1	o	VJAW0004	
		PACKING				
21	2	CUSHION TOP	1	o	VPGW0006	
22	2	CUSHION BOTTOM	1	o	VPGW0007	
23	2	POLY BAG FOR PSU	1	o	XZB17X27A02	
24	2	POLY BAG FOR PSU CORD	1	o	XZB10X22A02	
25	2	PSU PACKING CASE	1	o	VPKW0337	
26	2	OPERATING INSTRUCTION	1	o	VQTW0182	

Electrical Replacement Parts List

Note:
1. **Be sure to make your orders of replacement parts according to this list.**
2. **IMPORTANT SAFETY NOTICE**
Components identified by shade have special characteristics important for safety. When replacing any of these components, use only the original ones.
3. **Unless otherwise specified:**
All resistors are in OHMS (Ω), 1/8w, ±5% carbon, K=1,000Ω, M=1,000KΩ.
All capacitors are in MICROFARADS (μF), ±10% P=μμF.
All coils are in MICROHENRIES (μH), m=10,μ.
4. **C.B.A: Circuit Board Assembly.**
5. **C.B: Circuit Board.**

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
		VEPK00468A	Power Supply C.B.A.		
			Diodes		
D101		MI-152		1	
D102		MI-152R		1	
D103		LN21RP-TV		1	
			Resistor		
R101		ERD12TJ561	1/2W 560	1	
			Capacitor		
C105		ECET25R472SW	Electrolytic 25V 4700	1	
			Fuse		
F101		XBA1F08NU14A		1	
			Transformer		
T101		ETP57EU23B		1	
			Miscellaneous		
		VSWK0022	Power SW	1	
		TJC6319	Fuse Holder	2	
		VJJK0037	Remo.Con Jack	1	
		VEKW0612	10P Connector Ass'y	1	
		VJPK1076	M-Connector	1	
		VJJW0005	RCA Socket	1	